MATHEMATICS

QUESTION BANK

for

Summative Assessment -I

CLASS – IX

2014 – 15

CHAPTER WISE COVERAGE IN THE FORM
MCQ WORKSHEETS AND PRACTICE QUESTIONSS

Prepared by

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PREFACE

It gives me great pleasure in presenting the Question Bank for Summative Assessment (SA) - I. It is in accordance with the syllabus of the session 2014–15 for first term (CCE pattern).

Each chapter has a large number of multiple-choice questions in the form of Worksheets, which will help students quickly test their knowledge and skill.

A sufficient number of short answer type and long answer type questions are included in the form of PRACTICE QUESTIONS. This Question Bank is also helpful to all the teachers for internal assessment of the students.

Keeping the mind the mental level of a child, every effort has been made to introduce simple multiple choice questions so that the child solve them easily and gets confidence.

I avail this opportunity to convey my sincere thanks to respected sir Shri Isampal, Deputy Commissioner, KVS RO Bangalore, respected sir Shri P. V. Sairanga Rao, Deputy Commissioner, KVS RO Varanasi, respected sir Shri P. Deva Kumar, Deputy Commissioner, KVS RO Ahmedabad, respected sir Shri. K. L. Nagaraju, Assistant Commissioner, KVS RO Bangalore and respected sir Shri.Gangadharaiah, Assistant Commissioner, KVS RO Bangalore for their blessings, motivation and encouragement in bringing out this notes in such an excellent form.

I also extend my special thanks to respected madam Smt. Nirmala Kumari M., Principal, KV Donimalai and respected Shri. M. Vishwanatham, Principal, KV Raichur for their kind suggestions and motivation while preparing this Question Bank.

I would like to place on record my thanks to respected sir Shri. P. K. Chandran, Principal, presently working in KV Bambolim. I have started my career in KVS under his guidance, suggestions and motivation.

Inspite of my best efforts to make this Question Bank error free, some errors might have gone unnoticed. I shall be grateful to the students and teacher if the same are brought to my notice. You may send your valuable suggestions, feedback or queries through email to kumarsir34@gmail.com that would be verified by me and the corrections would be incorporated in the next year Question Bank.

M. S. KUMARSWAMY

DEDICATED

TO

MY FATHER

LATE SHRI. M. S. MALLAYYA

INDEX

SYLLABUS FOR 1ST TERM 2014 – 15
Course Structure
Class IX

First Term		Marks : 90
UNITS		**MARKS**
I	NUMBER SYSTEM	17
II	ALGEBRA	25
III	GEOMETRY	37
IV	CO-ORDINATE GEOMETRY	06
V	MENSURATION	05
	TOTAL THEORY	**90**

UNIT I : NUMBER SYSTEMS

1. REAL NUMBERS **(18) Periods**

Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals, on the number line through successive magnification.

Rational numbers as recurring/terminating decimals. Examples of nonrecurring / non terminating decimals such as $\sqrt{2}, \sqrt{3}, \sqrt{5}$ etc. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}, \sqrt{3}, \sqrt{5}$ and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, every point on the number line represents a unique real number.

Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized). Definition of *n*th root of a real number. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)

Rationalization (with precise meaning) of real numbers of the type (& their combinations) $\frac{1}{a+b\sqrt{x}}$ & $\frac{1}{\sqrt{x}+\sqrt{y}}$ where x and y are natural number and a, b are integers.

UNIT II : ALGEBRA

1. **POLYNOMIALS** **(23) Periods**

Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros/roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorization of $ax^2 + bx + c$, $a \neq 0$ where a, b, c are real numbers, and of cubic polynomials using the Factor Theorem. Recall of algebraic expressions and identities. Further identities of the type $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$, $(x + y)^3 = x^3 + y^3 + 3xy\,(x + y)$, $x^3 + y^3 + z^3 — 3xyz = (x + y + z)\,(x^2 + y^2 + z^2 — xy — yz — zx)$ and their use in factorization of polymonials. Simple expressions reducible to these polynomials.

UNIT III : GEOMETRY

1. INTRODUCTION TO EUCLID'S GEOMETRY (6) Periods

History - Euclid and geometry in India. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem.

1. Given two distinct points, there exists one and only one line through them.
2. (Prove) two distinct lines cannot have more than one point in common.

2. LINES AND ANGLES (10) Periods

1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180_o and the converse.
2. (Prove) If two lines intersect, the vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.
4. (Motivate) Lines, which are parallel to a given line, are parallel.
5. (Prove) The sum of the angles of a triangle is 180_o.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.

3. TRIANGLES (20) Periods

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).
3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruene).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.
5. (Prove) The angles opposite to equal sides of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between 'angle and facing side' inequalities in triangles.

UNIT IV : COORDINATE GEOMETRY

1. COORDINATE GEOMETRY (9) Periods

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $ax + by + c = 0$ by writing it as $y = mx + c$ and linking with the chapter on linear equations in two variables.

UNIT V : MENSURATION

1. AREAS (4) Periods

Area of a triangle using Hero's formula (without proof) and its application in finding the area of a quadrilateral.

MCQ WORKSHEET-I
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Rational number $\frac{3}{40}$ is equal to:

(a) 0.75 (b) 0.12 (c) 0.012 (d) 0.075

2. A rational number between 3 and 4 is:

(a) $\frac{3}{2}$ (b) $\frac{4}{3}$ (c) $\frac{7}{2}$ (d) $\frac{7}{4}$

3. A rational number between $\frac{3}{5}$ and $\frac{4}{5}$ is:

(a) $\frac{7}{5}$ (b) $\frac{7}{10}$ (c) $\frac{3}{10}$ (d) $\frac{4}{10}$

4. A rational number between $\frac{1}{2}$ and $\frac{3}{4}$ is:

(a) $\frac{2}{5}$ (b) $\frac{5}{8}$ (c) $\frac{4}{3}$ (d) $\frac{1}{4}$

5. Which one of the following is not a rational number:

(a) $\sqrt{2}$ (b) 0 (c) $\sqrt{4}$ (d) $\sqrt{-16}$

6. Which one of the following is an irrational number:

(a) $\sqrt{4}$ (b) $3\sqrt{8}$ (c) $\sqrt{100}$ (d) $-\sqrt{0.64}$

7. Decimal representation of $\frac{1}{5}$ is :

(a) 0.2 (b) 0.5 (c) 0.02 (d) 0.002

8. $3\frac{3}{8}$ in decimal form is:

(a) 3.35 (b) 3.375 (c) 33.75 (d) 337.5

9. $\frac{5}{6}$ in the decimal form is:

(a) $0.8\bar{3}$ (b) $0.8\overline{33}$ (c) $0.6\bar{3}$ (d) $0.6\overline{33}$

10. Decimal representation of rational number $\frac{8}{27}$ is:

(a) $0.\overline{296}$ (b) $0.29\bar{6}$ (c) $0.2\overline{96}$ (d) 0.296

MCQ WORKSHEET-II
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Which one of the following is a rational number:
(a) $\sqrt{3}$ (b) $\sqrt{2}$ (c) 0 (d) $\sqrt{5}$

2. 0.6666 in $\frac{p}{q}$ form is:
(a) $\frac{6}{99}$ (b) $\frac{2}{3}$ (c) $\frac{3}{5}$ (d) $\frac{1}{66}$

3. $4\frac{1}{8}$ in decimal form is:
(a) 4.125 (b) $4.\overline{15}$ (c) $4.1\overline{5}$ (d) $0.\overline{415}$

4. The value of $\left(3+\sqrt{3}\right)\left(3-\sqrt{3}\right)$ is:
(a) 0 (b) 6 (c) 9 (d) 3

5. The value of $\left(\sqrt{5}+\sqrt{2}\right)^2$ is:
(a) $7+2\sqrt{5}$ (b) $1+5\sqrt{2}$ (c) $7+2\sqrt{10}$ (d) $7-2\sqrt{10}$

6. The value of $\left(\sqrt{5}+\sqrt{2}\right)\left(\sqrt{5}-\sqrt{2}\right)$ is:
(a) 10 (b) 7 (c) 3 (d) $\sqrt{3}$

7. The value of $\left(3+\sqrt{3}\right)\left(2+\sqrt{2}\right)$ is:
$(a) 6+3\sqrt{2}+2\sqrt{3}+\sqrt{6}$
$(b) 3+3\sqrt{2}+3\sqrt{3}+6$
$(c) 6-3\sqrt{2}-2\sqrt{3}-\sqrt{6}$
$(d) 6-3\sqrt{2}+2\sqrt{3}-\sqrt{6}$

8. The value of $\left(\sqrt{11}+\sqrt{7}\right)\left(\sqrt{11}-\sqrt{7}\right)$ is:
(a) 4 (b) – 4 (c) 18 (d) – 18

9. The value of $\left(5+\sqrt{5}\right)\left(5-\sqrt{5}\right)$ is :
(a) 0 (b) 25 (c) 20 (d) – 20

10. On rationalizing the denominator of $\frac{1}{\sqrt{7}}$, we get
(a) 7 (b) $\frac{\sqrt{7}}{7}$ (c) $\frac{-\sqrt{7}}{7}$ (d) $\sqrt{7}$

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. On rationalizing the denominator of $\frac{1}{\sqrt{7}-\sqrt{6}}$, we get

(a) $\frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$ (b) $\frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ (c) $\sqrt{7}+\sqrt{6}$ (d) $\sqrt{7}-\sqrt{6}$

2. On rationalizing the denominator of $\frac{1}{\sqrt{5}+\sqrt{2}}$, we get

(a) $\sqrt{5}-\sqrt{2}$ (b) $\sqrt{2}-\sqrt{5}$ (c) $\frac{\sqrt{5}-\sqrt{2}}{3}$ (d) $\frac{\sqrt{2}-\sqrt{5}}{3}$

3. On rationalizing the denominator of $\frac{1}{\sqrt{7}-2}$, we get

(a) $\sqrt{7}-2$ (b) $\sqrt{7}+2$ (c) $\frac{\sqrt{7}+2}{3}$ (d) $\frac{\sqrt{7}-2}{3}$

4. On rationalizing the denominator of $\frac{1}{\sqrt{2}}$, we get

(a) 2 (b) $\sqrt{2}$ (c) $\frac{2}{\sqrt{2}}$ (d) $\frac{\sqrt{2}}{2}$

5. On rationalizing the denominator of $\frac{1}{2+\sqrt{3}}$, we get

(a) $2-\sqrt{3}$ (b) $\sqrt{3}-2$ (c) $2+\sqrt{3}$ (d) $-\sqrt{3}-2$

6. On rationalizing the denominator of $\frac{1}{\sqrt{3}-\sqrt{2}}$, we get

(a) $\frac{1}{\sqrt{3}+\sqrt{2}}$ (b) $\sqrt{3}+\sqrt{2}$ (c) $\sqrt{2}-\sqrt{3}$ (d) $-\sqrt{3}-\sqrt{2}$

7. The value of $64^{\frac{1}{2}}$ is :

(a) 8 (b) 4 (c) 16 (d) 32

8. The value of $32^{\frac{1}{5}}$ is :

(a) 16 (b) 160 (c) 2 (d) 18

9. The value of $(125)^{\frac{1}{3}}$ is :

(a) 5 (b) 25 (c) 45 (d) 35

10. The value of $9^{\frac{3}{2}}$ is :

(a) 18 (b) 27 (c) – 18 (d) $\frac{1}{27}$

MCQ WORKSHEET-IV
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. The value of $32^{2/5}$ is :
(a) 2 (b) 4 (c) 16 (d) 14

2. The value of $16^{3/4}$ is :
(a) 4 (b) 12 (c) 8 (d) 48

3. The value of $125^{\frac{-1}{3}}$ is :
(a) $\frac{1}{5}$ (b) $\frac{1}{25}$ (c) $\frac{1}{15}$ (d) $\frac{1}{125}$

4. The value of $11^{1/2} \div 11^{1/4}$ is :
(a) $11^{1/4}$ (b) $11^{3/4}$ (c) $11^{1/8}$ (d) $11^{1/2}$

5. The value of $64^{-3/2}$ is :
(a) $\frac{1}{96}$ (b) $\frac{1}{64}$ (c) 512 (d) $\frac{1}{512}$

6. The value of $(125)^{\frac{2}{3}}$ is :
(a) 5 (b) 25 (c) 45 (d) 35

7. The value of $25^{3/2}$ is :
(a) 5 (b) 25 (c) 125 (d) 625

8. The value of $\frac{1}{11}$ in decimal form is:
(a) $0.0\overline{99}$ (b) $0.\overline{909}$ (c) $0.\overline{09}$ (d) $0.00\overline{9}$

9. Decimal expansion of a rational number is terminating if in its denominator there is:
(a) 2 or 5 (b) 3 or 5 (c) 9 or 11 (d) 3 or 7

10. The exponent form of $\sqrt[3]{7}$ is:
(a) 7^3 (b) 3^7 (c) $7^{1/3}$ (d) $3^{1/7}$

MCQ WORKSHEET-V
CLASS IX : CHAPTER - 1
NUMBER SYSTEM

1. Which of the following is true?
(a) Every whole number is a natural number (b) Every integer is a rational number
(c) Every rational number is an integer (d) Every integer is a whole number

2. For Positive real numbers a and b, which is not true?
(a) $\sqrt{ab} = \sqrt{a}\sqrt{b}$ (b) $\left(a+\sqrt{b}\right)\left(a-\sqrt{b}\right) = a^2 - b$
(c) $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ (d) $\left(\sqrt{a}+\sqrt{b}\right)\left(\sqrt{a}-\sqrt{b}\right) = a+b$

3. Out of the following, the irrational number is
(a) $1.\bar{5}$ (b) $2.4\overline{77}$ (c) $1.2\overline{77}$ (d) π

4. To rationalize the denominator of $\frac{1}{\sqrt{a}+b}$,we multiply this by
(a) $\frac{1}{\sqrt{a}+b}$ (b) $\frac{1}{\sqrt{a}-b}$ (c) $\frac{\sqrt{a}+b}{\sqrt{a}+b}$ (d) $\frac{\sqrt{a}-b}{\sqrt{a}-b}$

5. The number of rational numbers between $\sqrt{3}$ and $\sqrt{5}$ is
(a) One (b) 3 (c) none (d) infinitely many

6. If we add two irrational numbers, the resulting number
(a) is always an irrational number (b) is always a rational number
(c) may be a rational or an irrational number (d) always an integer

7. The rationalizing factor of $7-2\sqrt{3}$ is
(a) $7-2\sqrt{3}$ (b) $7+2\sqrt{3}$ (c) $5+2\sqrt{3}$ (d) $4+2\sqrt{3}$

8. If $\frac{1}{7} = 0.\overline{142857}$, then $\frac{4}{7}$ equals
(a) $0.\overline{428571}$ (b) $0.\overline{571428}$ (c) $0.\overline{857142}$ (d) $0.\overline{285718}$

9. The value of n for which $\sqrt{n}$ be a rational number is
(a) 2 (b) 4 (c) 3 (d) 5

10. $\frac{3\sqrt{12}}{6\sqrt{27}}$ equals
(a) $\frac{1}{2}$ (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) $\frac{1}{3}$

11. $\left(3+\sqrt{3}\right)\left(3-\sqrt{2}\right)$ equals
(a) $9-5\sqrt{2}-\sqrt{6}$ (b) $9-\sqrt{6}$ (c) $3+\sqrt{2}$ (d) $9-3\sqrt{2}+3\sqrt{3}-\sqrt{6}$

12. The arrangement of $\sqrt{2}, \sqrt{5}, \sqrt{3}$ in ascending order is

(a) $\sqrt{2}, \sqrt{3}, \sqrt{5}$ (b) $\sqrt{2}, \sqrt{5}, \sqrt{3}$ (c) $\sqrt{5}, \sqrt{3}, \sqrt{2}$ (d) $\sqrt{3}, \sqrt{2}, \sqrt{5}$

13. If m and n are two natural numbers and $m^n = 32$, then n^{mn} is

(a) 5^2 (b) 5^3 (c) 5^{10} (d) 5^{12}

14. If $\sqrt{10} = 3.162$, then the value of $\frac{1}{\sqrt{10}}$ is

(a) 0.3162 (b) 3.162 (c) 31.62 (d) 316.2

15. If $\left(\frac{3}{4}\right)^6 \times \left(\frac{16}{9}\right)^5 = \left(\frac{4}{3}\right)^{x+2}$, then the value of x is

(a) 2 (b) 4 (c) -2 (d) 6

PRACTICE QUESTIONS

CLASS IX : CHAPTER - 1

NUMBER SYSTEM

1. Prove that $\sqrt{5}-\sqrt{3}$ is not a rational number.

2. Arrange the following in descending order of magnitude: $\sqrt[8]{90}, \sqrt[4]{10}, \sqrt{6}$

3. Simplify the following:

$(i)\left(4\sqrt{3}-2\sqrt{2}\right)\left(3\sqrt{2}+4\sqrt{3}\right)$

$(ii)\left(2+\sqrt{3}\right)\left(3+\sqrt{5}\right)$

$(iii)\left(\sqrt{3}+\sqrt{2}\right)^2$

$(iv)\left(\frac{2}{3}\sqrt{7}-\frac{1}{2}\sqrt{2}+6\sqrt{11}\right)+\left(\frac{1}{3}\sqrt{7}+\frac{3}{2}\sqrt{2}-\sqrt{11}\right)$

4. Rationalize the denominator of the following:

$(i)\ \frac{2}{\sqrt{3}-\sqrt{5}}$ $(ii)\ \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ $(iii)\frac{6}{\sqrt{5}+\sqrt{2}}$ $(iv)\frac{1}{8+5\sqrt{2}}$

$(v)\frac{3-2\sqrt{2}}{3+2\sqrt{2}}$ $(vi)\frac{\sqrt{3}-1}{\sqrt{3}+1}$ $(vii)\frac{4}{\sqrt{7}+\sqrt{3}}$ $(viii)\frac{1}{5+3\sqrt{2}}$

5. Rationalise the denominator of the following:

$(i)\frac{2}{3\sqrt{3}}$ $(ii)\frac{16}{\sqrt{41}-5}$ $(iii)\frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$

$(iv)\frac{\sqrt{40}}{\sqrt{3}}$ $(v)\frac{3+\sqrt{2}}{4\sqrt{2}}$ $(vi)\frac{2+\sqrt{3}}{2-\sqrt{3}}$

$(vii)\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}$ $(viii)\frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ $(ix)\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

6. If $a=6-\sqrt{35}$, find the value of $a^2+\frac{1}{a^2}$.

7. If $x=3+\sqrt{8}$, find the value of (i) $x^2+\frac{1}{x^2}$ and (ii) $x^4+\frac{1}{x^4}$

8. Simplify, by rationalizing the denominator $\frac{2\sqrt{6}}{\sqrt{2}+\sqrt{3}}+\frac{6\sqrt{2}}{\sqrt{6}+\sqrt{3}}-\frac{8\sqrt{3}}{\sqrt{6}+\sqrt{2}}$

9. Simplify, by rationalizing the denominator

$$\frac{1}{3-\sqrt{8}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}$$

10. If $x=\frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y=\frac{\sqrt{2}-1}{\sqrt{2}+1}$, find the value of x^2+y^2+xy.

11. If $x=\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y=\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, find the value of x^2+y^2.

12. If $x=\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ and $y=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$, find the value of $x+y+xy$.

13. If $x=\frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y=\frac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of x^2-y^2.

14. If $\frac{5+2\sqrt{3}}{7+\sqrt{3}}=a-\sqrt{3}b$, find a and b where a and b are rational numbers.

15. If a and b are rational numbers and $\frac{4+3\sqrt{5}}{4-3\sqrt{5}}=a+b\sqrt{5}$, find the values of a and b.

16. If a and b are rational numbers and $\frac{2+\sqrt{3}}{2-\sqrt{3}}=a+b\sqrt{3}$, find the values of a and b.

17. If a and b are rational numbers and $\frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}}=a-b\sqrt{77}$, find the values of a and b.

18. Evaluate: $\frac{1}{\sqrt{2}+1}+\frac{1}{\sqrt{3}+\sqrt{2}}+\frac{1}{\sqrt{4}+\sqrt{3}}+.....+\frac{1}{\sqrt{9}+\sqrt{8}}$

19. If $x=\frac{1}{2+\sqrt{3}}$, find the value of $2x^3-7x^2-2x+1$.

20. If $x=\frac{1}{2-\sqrt{3}}$, find the value of x^3-2x^2-7x+5.

21. If $\sqrt{2}=1.414$ and $\sqrt{5}=2.236$, find the value of $\frac{\sqrt{10}-\sqrt{5}}{2\sqrt{2}}$ upto three places of decimals.

22. Find six rational numbers between 3 and 4.

23. Find five rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$

24. Find the value of a and b in $\frac{\sqrt{3}-1}{\sqrt{3}+1}=a+b\sqrt{3}$.

25. Find the value of a and b in $\frac{5+2\sqrt{3}}{7+4\sqrt{3}}=a+b\sqrt{3}$

26. Find the value of a and b in $\frac{5-\sqrt{6}}{5+\sqrt{6}}=a-b\sqrt{6}$

27. Simplify $\frac{4+\sqrt{5}}{4-\sqrt{5}}+\frac{4-\sqrt{5}}{4+\sqrt{5}}$ by rationalizing the denominator.

28. Simplify $\frac{\sqrt{5}-1}{\sqrt{5}+1}+\frac{\sqrt{5}+1}{\sqrt{5}-1}$ by rationalizing the denominator.

29. Simplify $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}+\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ by rationalizing the denominator.

30. If x = $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

31. If x = $4-\sqrt{15}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

32. If x = $2+\sqrt{3}$, find (i) $x^2+\frac{1}{x^2}$ (ii) $x^4+\frac{1}{x^4}$.

33. Represent the real number $\sqrt{10}$ on the number line.

34. Represent the real number $\sqrt{13}$ on the number line.

35. Represent the real number $\sqrt{7}$ on the number line.

36. Represent the real number $\sqrt{2},\sqrt{3},\sqrt{5}$ on a single number line.

37. Find two rational number and two irrational number between $\sqrt{2}$ and $\sqrt{3}$.

38. Find the decimal expansions of $\frac{10}{3},\frac{7}{8}$ and $\frac{1}{7}$.

39. Show that 3.142678 is a rational number. In other words, express 3.142678 in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

40. Show that 0.3333……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

41. Show that 1.27272727……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

42. Show that 0.23535353……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

43. Express the following in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

$(i)0.\overline{6}$ $(ii)0.4\overline{7}$ $(iii)0.\overline{001}$ $(iv)0.2\overline{6}$

44. Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$.

45. Visualize the representation of $5.3\overline{7}$ using successive magnification

46. Visualize $4.\overline{26}$ on the number line, using successive magnification upto 4 decimal places.

47. Visualize 3.765 on the number line, using successive magnification.

48. Find the value of a and b in each of the following:

$(i)\frac{3+\sqrt{2}}{3-\sqrt{2}}=a+b\sqrt{2}$ $(ii)\frac{3+\sqrt{7}}{3-\sqrt{7}}=a+b\sqrt{7}$ $(iii)\frac{7+\sqrt{5}}{7-\sqrt{5}}=a+b\sqrt{5}$

49. Simplify each of the following by rationalizing the denominator.

$(i)\frac{6-4\sqrt{2}}{6+4\sqrt{2}}$ $(ii)\frac{\sqrt{5}-2}{\sqrt{5}+2}-\frac{\sqrt{5}+2}{\sqrt{5}-2}$

50. Evaluate the following expressions:

$(i)\left(\frac{256}{6561}\right)^{\frac{3}{8}}$ $(ii)\left(15625\right)^{\frac{1}{6}}$ $(iii)\left(\frac{343}{1331}\right)^{\frac{1}{3}}$

$(iv)\sqrt[8]{\frac{6561}{65536}}$ $(v)343^{-\frac{1}{3}}$

51. Simplify: $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$

52. Simplify: $\frac{7}{3\sqrt{3}-2\sqrt{2}}$

53. Simplify: $(i)\ \sqrt[4]{\sqrt[3]{2^2}}$ $(ii)\sqrt[3]{2}.\sqrt[4]{2}.\sqrt[12]{32}$

54. If $\sqrt{2}=1.4142$, then find the value of $\sqrt{\frac{\sqrt{2}+1}{\sqrt{2}-1}}$.

55. If $\sqrt{3}=1.732$, then find the value of $\sqrt{\frac{\sqrt{3}+1}{\sqrt{3}-1}}$.

56. Find the value of a if $\frac{6}{3\sqrt{2}-2\sqrt{3}}=3\sqrt{2}-a\sqrt{3}$

57. Evaluate the following expressions:

$(i)\left(\frac{625}{81}\right)^{-\frac{1}{4}}$ $(ii)27^{\frac{2}{3}}\times 27^{\frac{1}{3}}\times 27^{-\frac{4}{3}}$ $(iii)\left(6.25\right)^{\frac{3}{2}}$

$(iv)\left(0.000064\right)^{\frac{5}{6}}$ $(v)\left(17^2-8^2\right)^{\frac{1}{2}}$

58. Express $0.6+0.\overline{7}+0.4\overline{7}$ in the form of $\frac{p}{q}$, where p and q are integers and $q\neq 0$.

59. Simplify: $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}}-\frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}}-\frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$

60. If $\sqrt{2}=1.414,\sqrt{3}=1.732$, then find the value of $\frac{4}{3\sqrt{3}-2\sqrt{2}}+\frac{3}{3\sqrt{3}+2\sqrt{2}}$.

61. Simplify:

$(i)\ \left[5\left(8^{\frac{1}{3}}+27^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$ $(ii)\sqrt{45}-3\sqrt{20}+4\sqrt{5}$ $(iii)\frac{\sqrt{24}}{8}+\frac{\sqrt{54}}{9}$

$(iv)\sqrt[4]{12}\times\sqrt[6]{7}$ $(v)\sqrt[4]{28}\div\sqrt[3]{7}$ $(vi)\sqrt[3]{3}+2\sqrt{27}+\frac{1}{\sqrt{3}}$

$(vii)\left(\sqrt{3}-\sqrt{5}\right)^2$ $(viii)\sqrt[4]{81}-8\sqrt[3]{216}+15\sqrt[5]{32}+\sqrt{225}$

$(ix)\frac{3}{\sqrt{8}}+\frac{1}{\sqrt{2}}$ $(x)\frac{\sqrt[2]{3}}{3}-\frac{\sqrt{3}}{6}$

62. If $a=\frac{3+\sqrt{5}}{2}$ then find the value of $a^2+\frac{1}{a^2}$.

63. Simplify: $\left(256\right)^{\left(-4^{\frac{-3}{2}}\right)}$

64. Find the value of $\frac{4}{\left(216\right)^{\frac{-2}{3}}}+\frac{1}{\left(256\right)^{\frac{-3}{4}}}+\frac{2}{\left(243\right)^{\frac{-1}{5}}}$

65. If $a=5+2\sqrt{6}$ and $b=\frac{1}{a}$ then what will be the value of $a^2 + b^2$?

66. Find the value of a and b in each of the following:

$(i)\dfrac{3-\sqrt{5}}{3+2\sqrt{5}}=a\sqrt{5}-\dfrac{19}{11}$

$(ii)\dfrac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}}=2-b\sqrt{6}$

$(iii)\dfrac{7+\sqrt{5}}{7-\sqrt{5}}-\dfrac{7-\sqrt{5}}{7+\sqrt{5}}=a+\dfrac{7}{11}b\sqrt{5}$

67. If $a=2+\sqrt{3}$, then find the value of $a-\dfrac{1}{a}$.

68. Rationalise the denominator in each of the following and hence evaluate by taking $\sqrt{2}=1.414, \sqrt{3}=1.732$ and $\sqrt{5}=2.236$, upto three places of decimal.

$(i)\dfrac{4}{\sqrt{3}}$ $(ii)\dfrac{6}{\sqrt{6}}$ $(iii)\dfrac{\sqrt{10}-\sqrt{5}}{2}$ $(iv)\dfrac{\sqrt{2}}{2+\sqrt{2}}$ $(v)\dfrac{1}{\sqrt{3}+\sqrt{2}}$

69. Simplify:

$(i)\left(1^3+2^3+3^3\right)^{\frac{1}{2}}$ $(ii)\left(\dfrac{3}{5}\right)^4\left(\dfrac{8}{5}\right)^{-12}\left(\dfrac{32}{5}\right)^6$ $(iii)\left(-\dfrac{1}{27}\right)^{\frac{-2}{3}}$

$(iv)\left[\left(\left(625\right)^{\frac{-1}{2}}\right)^{\frac{-1}{4}}\right]^2$ $(v)\dfrac{8^{\frac{1}{3}}\times16^{\frac{1}{3}}}{32^{\frac{-1}{3}}}$ $(vi)64^{\frac{-1}{3}}\left[64^{\frac{1}{3}}-64^{\frac{2}{3}}\right]$

70. Simplify: $\dfrac{9^{\frac{1}{3}}\times27^{\frac{-1}{2}}}{3^{\frac{1}{6}}\times3^{\frac{-2}{3}}}$

MCQ WORKSHEET-I
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. In $2 + x + x^2$ the coefficient of x^2 is:
(a) 2 (b) 1 (c) – 2 (d) –1

2. In $2 – x^2 + x^3$ the coefficient of x^2 is:
(a) 2 (b) 1 (c) – 2 (d) –1

3. In $\frac{\pi x^2}{2} + x + 10$, the coefficient of x^2 is:
(a) $\frac{\pi}{2}$ (b) 1 (c) $-\frac{\pi}{2}$ (d) –1

4. The degree of $5t – 7$ is:
1. 0 (b) 1 (c) 2 (d) 3

5. The degree of $4 – y^2$ is:
(a) 0 (b) 1 (c) 2 (d) 3

6. The degree of 3 is:
(a) 0 (b) 1 (c) 2 (d) 3

7. The value of $p(x) = 5x – 4x^2 + 3$ for $x = 0$ is:
(a) 3 (b) 2 (c) – 3 (d) – 2

8. The value of $p(x) = 5x – 4x^2 + 3$ for $x = – 1$ is:
(a) 6 (b) –6 (c) 3 (d) – 3

9. The value of $p(x) = (x – 1)(x + 1)$ for $p(1)$ is:
(a) 1 (b) 0 (c) 2 (d) – 2

10. The value of $p(t) = 2 + t + 2t^2 – t^3$ for $p(0)$ is:
(a) 1 (b) 2 (c) – 1 (d) 3

11. The value of $p(t) = 2 + t + 2t^2 – t^3$ for $p(2)$ is:
(a) 4 (b) –4 (c) 6 (d) 7

12. The value of $p(y) = y^2 – y + 1$ for $p(0)$ is:
(a) –1 (b) 3 (c) –2 (d) 1

MCQ WORKSHEET-ii
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. The zero of p(x) = 2x – 7 is:
(a) $\frac{7}{2}$ (b) $\frac{2}{7}$ (c) $\frac{-2}{7}$ (d) $\frac{-7}{2}$

2. The zero of p(x) = 9x + 4 is:
(a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-4}{9}$ (d) $\frac{-9}{4}$

3. Which are the zeroes of p(x) = x^2 – 1:
(a) 1, –1 (b) – 1, 2 (c) –2, 2 (d) –3, 3

4. Which are the zeroes of p(x) = (x – 1)(x – 2):
(a) 1, –2 (b) – 1, 2 (c) 1, 2 (d) –1, –2

5. Which one of the following is the zero of p(x) = lx + m
(a) $\frac{m}{l}$ (b) $\frac{l}{m}$ (c) $-\frac{m}{l}$ (d) $-\frac{l}{m}$

6. Which one of the following is the zero of p(x) = $5x-\pi$:
(a) $-\frac{4}{5}\pi$ (b) $\frac{1}{5}\pi$ (c) $\frac{4}{5}\pi$ (d) none of these

7. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder:
(a) 1 (b) 0 (c) – 1 (d) 2

8. On dividing $x^3 + 3x^2 + 3x + 1$ by $x+\pi$ we get remainder:
$(a)-\pi^3+3\pi^2-3\pi+1$
$(b)\pi^3-3\pi^2+3\pi+1$
$(c)-\pi^3-3\pi^2-3\pi-1$
$(d)-\pi^3+3\pi^2-3\pi-1$

9. On dividing $x^3 + 3x^2 + 3x + 1$ by 5 + 2x we get remainder:
(a) $\frac{8}{27}$ (b) $\frac{27}{8}$ (c) $-\frac{27}{8}$ (d) $-\frac{8}{27}$

10. If x – 2 is a factor of x^3 – 3x +5a then the value of a is:
(a) 1 (b) –1 (c) $\frac{2}{5}$ (d) $\frac{-2}{5}$

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. $(x + 8)(x – 10)$ in the expanded form is:
(a) $x^2 – 8x – 80$ (b) $x^2 – 2x – 80$ (c) $x^2 + 2x + 80$ (d) $x^2 – 2x + 80$

2. The value of 95 x 96 is:
(a) 9020 (b) 9120 (c) 9320 (d) 9340

3. The value of 104 x 96 is:
(a) 9984 (b) 9624 (c) 9980 (d) 9986

4. Without actual calculating the cubes the value of $28^3 + (–15)^3 + (–13)^3$ is:
(a) 16380 (b) –16380 (c) 15380 (d) –15380

5. If $x – 2$ is a factor of $x^3 – 2ax^2 + ax – 1$ then the value of a is:
(a) $\frac{7}{6}$ (b) $\frac{-7}{6}$ (c) $\frac{6}{7}$ (d) $\frac{-6}{7}$

6. If $x + 2$ is a factor of $x^3 + 2ax^2 + ax – 1$ then the value of a is:
(a) $\frac{2}{3}$ (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) $\frac{1}{2}$

7. If $x + y + z = 0$ then $x^3 + y^3 + z^3$ is equal to
(a) 3xyz (b) – 3xyz (c) xy (d) –2xy

8. The factors of $2x^2 – 7x + 3$ are:
(a) $(x – 3)(2x – 1)$ (b) $(x + 3)(2x + 1)$
(c) $(x – 3)(2x + 1)$ (d) $(x + 3)(2x – 1)$

9. The factors of $6x^2 + 5x – 6$ are:
(a) $(2x – 3)(3x – 2)$ (b) $(2x – 3)(3x + 2)$
(c) $(2x + 3)(3x – 2)$ (d) $(2x + 3)(3x + 2)$

10. The factors of $3x^2 – x – 4$ are:
(a) $(3x – 4)(x – 1)$ (b) $(3x – 4)(x + 1)$
(c) $(3x + 4)(x – 1)$ (d) $(3x + 4)(x + 1)$

11. The factors of $12x^2 – 7x + 1$ are:
(a) $(4x – 1)(3x – 1)$ (b) $(4x – 1)(3x + 1)$
(c) $(4x + 1)(3x – 1)$ (d) $(4x + 1)(3x + 1)$

12. The factors of $x^3 – 2x^2 – x + 2$ are:
(a) $(x – 1)(x – 1)(x – 5)$ (b) $(x + 1)(x + 1)(x + 5)$
(c) $(x + 1)(x – 1)(x + 5)$ (d) $(x + 1)(x + 1)(x – 5)$

MCQ WORKSHEET-Iv
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. Which of the following is not a polynomial?
(a) $x^2+\sqrt{2}x+3$ (b) $x^2+\sqrt{2x}+6$ (c) x^3+3x^2-3 (d) $6x+4$

2. The degree of the polynomial $3x^3 - x^4 + 5x + 3$ is
(a) –4 (b) 4 (c) 1 (d) 3

3. Zero of the polynomial $p(x) = a^2x$, $a \neq 0$ is
(a) x = 0 (b) x = 1 (c) x = –1 (d) a = 0

4. Which of the following is a term of a polynomial?
(a) 2x (b) $\frac{3}{x}$ (c) $x^{\sqrt{x}}$ (d) $\sqrt{x}$

5. If $p(x) = 5x^2 - 3x + 7$, then p(1) equals
(a) –10 (b) 9 (c) –9 (d) 10

6. Factorisation of $x^3 + 1$ is
(a) $(x + 1)(x^2 – x + 1)$ (b) $(x + 1)(x^2 + x + 1)$
(c) $(x + 1)(x^2 – x – 1)$ (d) $(x + 1)(x^2 + 1)$

7. If x + y + 2 = 0, then $x^3 + y^3 + 8$ equals
(a) $(x + y + 2)^3$ (b) 0 (c) 6xy (d) –6xy

8. If x = 2 is a zero of the polynomial $2x^2 + 3x – p$, then the value of p is
(a) –4 (b) 0 (c) 8 (d) 14

9. $x+\frac{1}{x}$ is
(a) a polynomial of degree 1 (b) a polynomial of degree 2
(c) a polynomial of degree 3 (d) not a polynomial

10. Integral zeroes of the polynomial (x + 3)(x – 7) are
(a) –3, –7 (b) 3, 7 (c) –3, 7 (d) 3, –7

11. The remainder when $p(x) = 2x^2 – x – 6$ is divided by (x – 2) is
(a) p(– 2) (b) p(2) (c) p(3) (d) p(–3)

12. If $2\left(a^2+b^2\right)=\left(a+b\right)^2$, then
(a) a + b = 0 (b) a = b (c) 2a = b (d) ab = 0

13. If $x^3 + 3x^2 + 3x + 1$ is divided by (x + 1), then the remainder is
(a) –8 (b) 0 (c) 8 (d) $\frac{1}{8}$

14. The value of $(525)^2 – (475)^2$ is
(a) 100 (b) 1000 (c) 100000 (d) –100

15. If a + b = –1, then the value of $a^3 + b^3 - 3ab$ is

(a) –1 (b) 1 (c) 26 (d) –26

16. The value of $(2-a)^3 + (2-b)^3 + (2-c)^3 - 3(2-a)(2-b)(2-c)$ when a + b + c = 6 is

(a) –3 (b) 3 (c) 0 (d) –1

17. If $\frac{a}{b} + \frac{b}{a} = 1, (a \neq 0, b \neq 0)$, then the value of $a^3 - b^3$ is

(a) –1 (b) 0 (c) 1 (d) $\frac{1}{2}$

18. If $x = \frac{1}{2-\sqrt{3}}$, then the value of $(x^2 - 4x + 1)$ is

(a) –1 (b) 0 (c) 1 (d) 3

19. The number of zeroes of the polynomial $x^3 + x - 3 - 3x^2$ is

(a) 1 (b) 2 (c) 0 (d) 3

20. If (x + 2) and (x – 2) are factors of $ax^4 + 2x - 3x^2 + bx - 4$, then the value of a + b is

(a) –7 (b) 7 (c) 14 (d) –8

PRACTICE QUESTIONS
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. Factorize the following: $9x^2 + 6x + 1 - 25y^2$.

2. Factorize the following: $a^2 + b^2 + 2ab + 2bc + 2ca$

3. Show that $p(x) = x^3 - 3x^2 + 2x - 6$ has only one real zero.

4. Find the value of a if x + 6 is a factor of $x^3 + 3x^2 + 4x + a$.

5. If polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ leaves the same remainder when each is divided by x – 4, find the value of a..

6. The polynomial $f(x)= x^4 - 2x^3 + 3x^2 - ax + b$ when divided by (x – 1) and (x + 1) leaves the remainders 5 and 19 respectively. Find the values of a and b. Hence, find the remainder when f(x) is divided by (x – 2).

7. If the polynomials $2x^3 + ax^2 + 3x - 5$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by (x – 2), find the value of a. Also, find the remainder in each case.

8. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a.

9. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$ leaves the remainder 19. Find the values of a. Also find the remainder when $p(x)$ is divided by $x + 2$.

10. If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.

11. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

12. Simplify $(2x - 5y)^3 - (2x + 5y)^3$.

13. Multiply $x^2 + 4y^2 + z^2 + 2xy + xz - 2yz$ by $(-z + x - 2y)$.

14. If a, b, c are all non-zero and $a + b + c = 0$, prove that $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$

15. If $a + b + c = 5$ and $ab + bc + ca = 10$, then prove that $a^3 + b^3 + c^3 - 3abc = -25$.

16. Without actual division, prove that $2x^4 - 6x^3 + 3x^2 + 3x - 2$ is exactly divisible by $x^2 - 3x + 2$.

17. Without actual division, prove that $x^3 - 3x^2 - 13x + 15$ is exactly divisible by $x^2 + 2x - 3$.

18. Find the values of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by (x – 1) as well as (x – 2).

19. Find the integral zeroes of the polynomial $2x^3 + 5x^2 - 5x - 2$.

20. If (x – 3) and $\left(x - \frac{1}{3}\right)$ are both factors of $ax^2 + 5x + b$, then show that a = b.

21. Find the values of a and b so that the polynomial $x^4 + ax^3 - 7x^2 + 8x + b$ is exactly divisible by (x + 2) as well as (x + 3).

22. If $x^3 + ax^2 + bx + 6$ has $(x - 2)$ as a factor and leaves a remainder 3 when divided by $(x - 3)$, find the values of a and b.

23. Find the value of $x^3 + y^3 + 15xy - 125$ if $x + y = 5$.

24. Without actually calculating, find the value of $(25)^3 - (75)^3 + (50)^3$.

25. Factorise each of the following cubic expressions:

(i) $8x^3 - y^3 - 12x^2y + 6xy^2$

(ii) $27q^3 - 125p^3 - 135q^2p + 225qp^2$

(iii) $8x^3 + 729 + 108x^2 + 486x$

(iv) $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$

26. Factorise:

(i) $x^3 + 216y^3 + 8z^3 - 36xyz$

(ii) $a^3 - 64b^3 - 27c^3 - 36abc$

27. Factorise: $\left(\frac{1}{2}x - 3y\right)^3 + \left(3y - \sqrt{3}z\right)^3 + \left(\sqrt{3}z - \frac{1}{2}x\right)^3$

28. Give one example each of a binomial of degree 35, and of a monomial of degree 100.

29. Find a zero of the polynomial $p(x) = 2x + 1$.

30. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.

31. Find the zero of the polynomial in each of the following cases:

(i) $p(x) = x + 5$ (ii) $p(x) = x - 5$ (iii) $p(x) = 2x + 5$

(iv) $p(x) = 3x - 2$ (v) $p(x) = 3x$ (vi) $p(x) = ax$, $a \neq 0$

32. Find the value of each of the following polynomials at the indicated value of variables:

(i) $p(x) = 5x^2 - 3x + 7$ at $x = 1$.

(ii) $q(y) = 3y^3 - 4y + \sqrt{11}$ at $y = 2$.

(iii) $p(t) = 4t^4 + 5t^3 - t^2 + 6$ at $t = a$.

33. Divide $p(x)$ by $g(x)$, where $p(x) = x + 3x^2 - 1$ and $g(x) = 1 + x$.

34. Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by $x - 1$.

35. Find the remainder obtained on dividing $p(x) = x^3 + 1$ by $x + 1$.

36. Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by $x - 1$.

37. Check whether the polynomial $q(t) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.

38. Check whether p(x) is a multiple of g(x) or not, where $p(x) = x^3 - x + 1$, $g(x) = 2 - 3x$.

39. Check whether g(x) is a factor of p(x) or not, where $p(x) = 8x^3 - 6x^2 - 4x + 3$, $g(x) = \frac{x}{3} - \frac{1}{4}$.

40. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$.

41. Examine whether $x + 2$ is a factor of $x^3 + 3x^2 + 5x + 6$ and of $2x + 4$.

42. Find the value of k, if $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$.

43. Find the value of a, if $x - a$ is a factor of $x^3 - ax^2 + 2x + a - 1$.

44. Factorise $6x^2 + 17x + 5$

45. Factorise $y^2 - 5y + 6$

46. Factorise $x^3 - 23x^2 + 142x - 120$.

47. Factorise :
(i) $x^3 - 2x^2 - x + 2$ (ii) $x^3 - 3x^2 - 9x - 5$
(iii) $x^3 + 13x^2 + 32x + 20$ (iv) $2y^3 + y^2 - 2y - 1$

48. Factorise : $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

49. Expand $(4a - 2b - 3c)^2$.

50. Factorise $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

51. If $x + 1$ is a factor of $ax3 + x2 - 2x + 4a - 9$, find the value of a.

52. By actual division, find the quotient and the remainder when the first polynomial is divided by the second polynomial : $x^4 + 1$; $x - 1$

53. Find the zeroes of the polynomial : $p(x) = (x - 2)^2 - (x + 2)^2$

54. Factorise :
(i) $x^2 + 9x + 18$ (ii) $6x^2 + 7x - 3$
(iii) $2x^2 - 7x - 15$ (iv) $84 - 2r - 2r^2$

55. Factorise :
(i) $2x^3 - 3x^2 - 17x + 30$ (ii) $x^3 - 6x^2 + 11x - 6$
(iii) $x^3 + x^2 - 4x - 4$ (iv) $3x^3 - x^2 - 3x + 1$

56. Using suitable identity, evaluate the following:
(i) 103^3 (ii) 101×102 (iii) 999^2

57. Factorise the following:
(i) $4x^2 + 20x + 25$
(ii) $9y^2 - 66yz + 121z^2$
(iii) $\left(2x + \frac{1}{3}\right)^2 - \left(x - \frac{1}{2}\right)^2$

58. Factorise the following :
(i) $9x^2 - 12x + 3$ (ii) $9x^2 - 12x + 4$

59. If $a + b + c = 9$ and $ab + bc + ca = 26$, find $a^2 + b^2 + c^2$.

60. Expand the following :
(i) $(4a - b + 2c)^2$
(ii) $(3a - 5b - c)^2$

(iii) $(-x + 2y - 3z)^2$

61. Find the value of
(i) $x^3 + y^3 - 12xy + 64$, when $x + y = -4$
(ii) $x^3 - 8y^3 - 36xy - 216$, when $x = 2y + 6$

62. Factorise the following :
(i) $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24xz$
(ii) $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20xz$
(iii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24\,xz$

63. Expand the following :
(i) $(3a - 2b)^3$ (ii) $\left(\frac{1}{x} + \frac{y}{3}\right)^3$ (iii) $\left(4 - \frac{1}{3x}\right)^3$

64. Find the following products:
(i) $\left(\frac{x}{2} + 2y\right)\left(\frac{x^2}{4} - xy + 4y^2\right)$ (ii) $(x^2 - 1)(x^4 + x^2 + 1)$

65. Factorise the following :
(i) $8p^3 + \frac{12}{5}p^2 + \frac{6}{25}p + \frac{1}{125}$
(ii) $1 - 64a^3 - 12a + 48a^2$

66. Without finding the cubes, factorise $(x - 2y)^3 + (2y - 3z)^3 + (3z - x)^3$

67. Give possible expressions for the length and breadth of the rectangle whose area is given by $4a^2 + 4a - 3$.

68. Factorise: (i) $1 + 64x^3$ (ii) $a^3 - 2\sqrt{2}b^3$

69. Evaluate each of the following using suitable identities:
(i) $(104)^3$ (ii) $(999)^3$

70. Factorise : $8x^3 + 27y^3 + 36x^2y + 54xy^2$

71. Factorise : $8x^3 + y^3 + 27z^3 - 18xyz$

72. Verify : (i) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ (ii) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

73. Factorise each of the following:
(i) $27y^3 + 125z^3$ (ii) $64m^3 - 343n^3$

74. Factorise : $27x^3 + y^3 + z^3 - 9xyz$

75. Without actually calculating the cubes, find the value of each of the following:
(i) $(-12)^3 + (7)^3 + (5)^3$
(ii) $(28)^3 + (-15)^3 + (-13)^3$

76. Find the following product :$(2x - y + 3z)(4x^2 + y^2 + 9z^2 + 2xy + 3yz - 6xz)$

77. Factorise :
(i) $a^3 - 8b^3 - 64c^3 - 24abc$ (ii) $2\sqrt{2}\,a^3 + 8b^3 - 27c^3 + 18\,\sqrt{2}\,abc$.

78. Give possible expressions for the length and breadth of rectangles, in which its areas is given by $35y^2 + 13y - 12$

79. Without actually calculating the cubes, find the value of :

$(i)\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$ $\qquad$ $(ii)\left(0.2\right)^3 - \left(0.3\right)^3 + \left(0.1\right)^3$

80. By Remainder Theorem find the remainder, when $p(x)$ is divided by $g(x)$, where
(i) $p(x) = x^3 - 2x^2 - 4x - 1$, $g(x) = x + 1$
(ii) $p(x) = x^3 - 3x^2 + 4x + 50$, $g(x) = x - 3$
(iii) $p(x) = 4x^3 - 12x^2 + 14x - 3$, $g(x) = 2x - 1$
(iv) $p(x) = x^3 - 6x^2 + 2x - 4$, $g(x) = 1 - \frac{3}{2}x$

81. Check whether $p(x)$ is a multiple of $g(x)$ or not :
(i) $p(x) = x^3 - 5x^2 + 4x - 3$, $g(x) = x - 2$
(ii) $p(x) = 2x^3 - 11x^2 - 4x + 5$, $g(x) = 2x + 1$

82. Show that $p - 1$ is a factor of $p^{10} - 1$ and also of $p^{11} - 1$.

83. For what value of m is $x^3 - 2mx^2 + 16$ divisible by $x + 2$?

84. If $x + 2a$ is a factor of $x^5 - 4a^2x^3 + 2x + 2a + 3$, find a.

85. Find the value of m so that $2x - 1$ be a factor of $8x^4 + 4x^3 - 16x^2 + 10x + m$.

86. Show that :
(i) $x + 3$ is a factor of $69 + 11x - x^2 + x^3$.
(ii) $2x - 3$ is a factor of $x + 2x^3 - 9x^2 + 12$.

87. If $x + y = 12$ and $xy = 27$, find the value of $x^3 + y^3$.

88. Without actually calculating the cubes, find the value of $48^3 - 30^3 - 18^3$.

89. Without finding the cubes, factorise $(2x - 5y)^3 + (5y - 3z)^3 + (3z - 2x)^3$.

90. Without finding the cubes, factorise $(x - y)^3 + (y - z)^3 + (z - x)^3$.

MCQ WORKSHEET-I
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Point (–3, –2) lies in the quadrant:
(a) I (b) II (c) III (d) IV

2. Point (5, –4) lies in the quadrant:
(a) I (b) II (c) III (d) IV

3. Point (1, 7) lies in the quadrant:
(a) I (b) II (c) III (d) IV

4. Point (–6, 4) lies in the quadrant:
(a) I (b) II (c) III (d) IV

5. The point (–4, –3) means:
(a) x = –4, y = –3 (b) x = –3, y = –4 (c) x = 4, y = 3 (d) None of these

6. Point (0, 4) lies on the:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

7. Point (5, 0) lies on the:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

8. On joining points (0, 0), (0, 2), (2,2) and (2, 0) we obtain a:
(a) Square (b) Rectangle (c) Rhombus (d) Parallelogram

9. Point (–2, 3) lies in the:
(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

10. Point (0, –2) lies:
(a) on the x-axis (b) in the II quadrant (c) on the y-axis (d) in the IV quadrant

11. Signs of the abscissa and ordinate of a point in the first quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

12. Signs of the abscissa and ordinate of a point in the second quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

13. Signs of the abscissa and ordinate of a point in the third quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

14. Signs of the abscissa and ordinate of a point in the fourth quadrant are respectively:
(a) +, + (b) –, + (c) +, – (d) –, –

15. Point (–1, 0) lies in the:
(a) on the negative direction of x – axis (b) on the negative direction of y – axis
(c) in the III quadrant (d) in the IV quadrant

MCQ WORKSHEET-II
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Point (0, –2) lies in the:
(a) on the negative direction of x – axis (b) on the negative direction of y – axis
(c) in the I quadrant (d) in the II quadrant

2. Abscissa of the all the points on x – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

3. Ordinate of the all the points on x – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

4. Abscissa of the all the points on y – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

5. Ordinate of the all the points on y – axis is:
(a) 0 (b) 1 (c) –1 (d) any number

6. A point both of whose coordinates are negative will lie in:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

7. A point both of whose coordinates are positive will lie in:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

8. If y – coordinate of a point is zero, then this point always lies:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

9. If x – coordinate of a point is zero, then this point always lies:
(a) I quadrant (b) II quadrant (c) x – axis (d) y – axis

10. The point (1, –1), (2, –2), (4, –5), (–3,–4) lies in:
(a) II quadrant (b) III quadrant (c) IV quadrant
(d) do not lie in the same quadrant

11. The point (1, –2), (2, –3), (4, –6), (2,–7) lies in:
(a) II quadrant (b) III quadrant (c) IV quadrant
(d) do not lie in the same quadrant

12. The point (–5, 2) and (2,–5) lies in:
(a) same quadrant (b) II and III quadrant, respectively
(c) II and IV quadrant, , respectively (d) IV and II quadrant, respectively

13. The point whose ordinate is 4 and which lies on y – axis is:
(a) (4, 0) (b) (0, 4) (c) (1, 4) (d) (4, 2)

14. Abscissa of a point is positive in:
(a) I and II quadrant (b) I and IV quadrant
(c) I quadrant only (d) II quadrant only

15. The perpendicular distance of the point P(3,4) from the y – axis is:
(a) 3 (b) 4 (c) 5 (d) 7

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. The point (–2, –5) lies in the
(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

2. The sign of x-coordinate of a point lying in third quadrant is
(a) + (b) – (c) ± (d) IV quadrant

3. The signs of respective x-coordinate and y-coordinates of a point lying 2nd quadrant are
(a) –, + (b) –, – (c) +, – (d) +, +

4. The point (0, 4) lies on
(a) I quadrant (b) negative x – axis (c) positive x – axis (d) y – axis

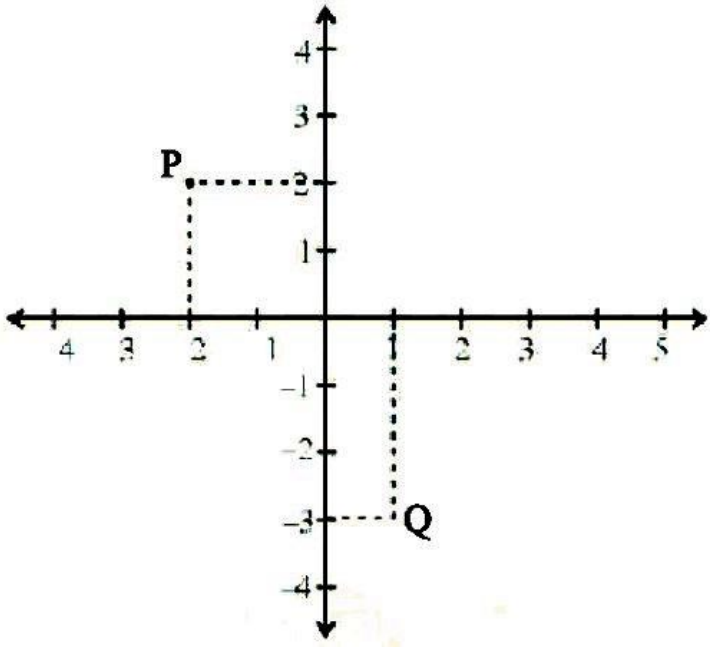
5. The y-coordinate of any point lying on x-axis is
(a) 0 (b) 1 (c) –1 (d) any number

6. The point where the two axes meet, is called
(a) x-coordinate (b) y- coordinate (c) quadrant (d) origin

7. The point (–5, 4) and (4, –5) are situated in
(a) same quadrant (b) I and III quadrant, respectively
(c) Different quadrants (d) IV and II quadrant, respectively

8. The figure obtained by plotting the points (2, 3), (–2, 3),(–2, –3) and (2, –3) is a
(a) trapezium (b) rectangle (c) square (d) rhombus

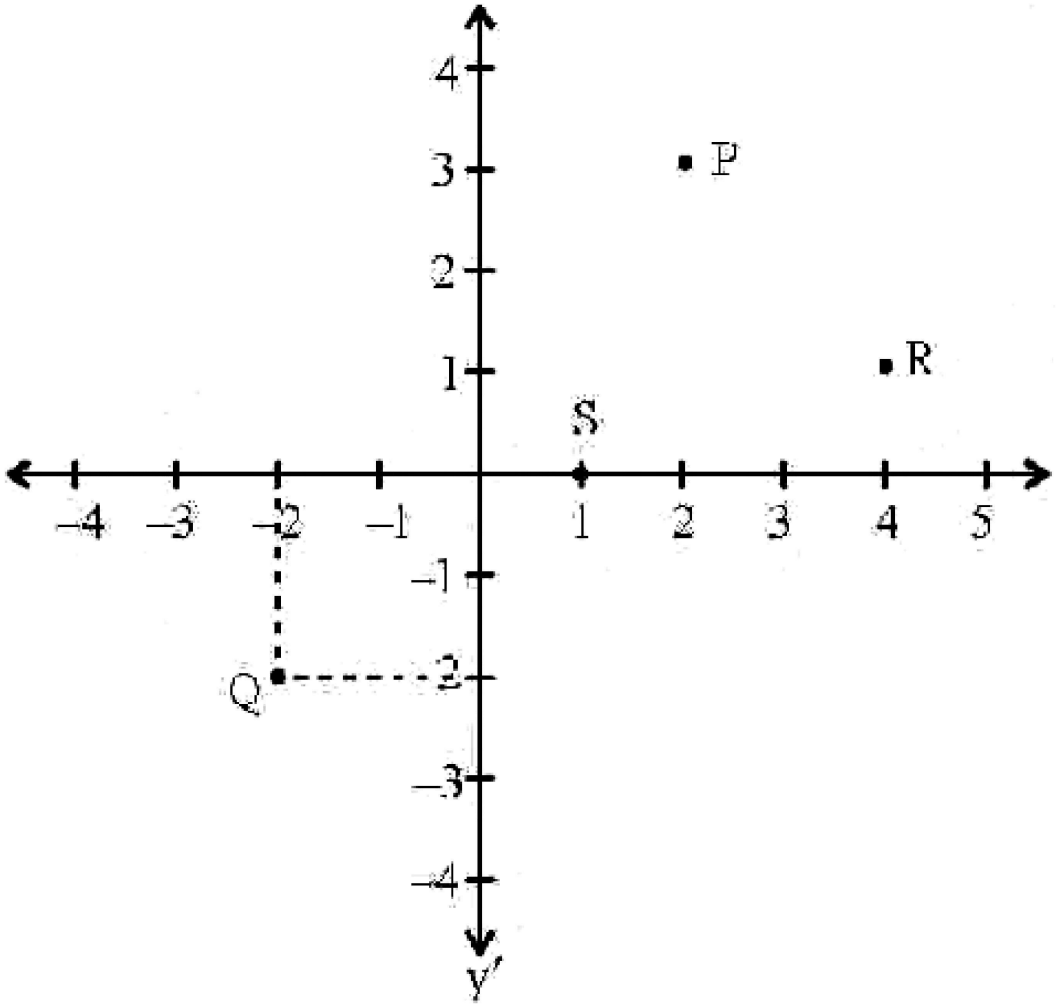
9. In the given figure, on the sides the respective coordinates of points P and Q respectively are:
(a) (–2, –2), (1, 3) (b) (–2, –2), (–1, 3) (c) (–2, 2), (1, –3) (d) (–2, 2), (1, 3)



10. The point (0, –3) lies on
(a) negative side of y – axis (b) negative side of x – axis
(c) positive side of x – axis (d) positive side of y – axis

11. If the coordinates of two points P and Q are (2, –3) and (–6, 5), then the value of (x-coordinate of P) – (x-coordinate of Q) is
(a) 2 (b) –6 (c) –8 (d) 8

12. The point whose y-coordinate is 3 in the given figure is
(a) P (b) Q (c) R (d) S



13. The coordinates of the point lying on the negative side of x-axis at a distance of 5 units from origin are
(a) (0, 5) (b) (0, –5) (c) (–5, 0) (d) (5, 0)

14. The distance of the (4, –3) from x – axis is
(a) 3 units (b) –3 units (c) 4 units (d) 5 units

15. The origin lies on
(a) x-axis only (b) both axes (c) y-axis only (d) none of the axes

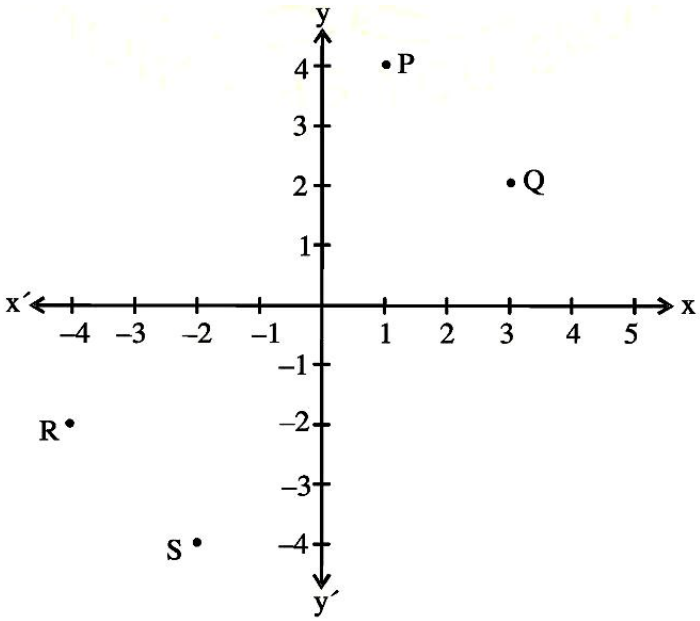
PRACTICE QUESTIONS
CLASS IX : CHAPTER - 3
COORDINATE GEOMETRY

1. Which of the following points lie in I and II quadrants?
(1, 1), (2, –3), (–2, 3), (-1, 1), (–3, –2), (4, 3)

2. Which of the following points lie on (a) x-axis (b) y-axis?
(5, 1), (8, 0), (0, 4), (–3, 0), (0, –3), (0, 5), (0, 0)

3. If the x-coordinate of a point is negative, it can lie in which quadrants?

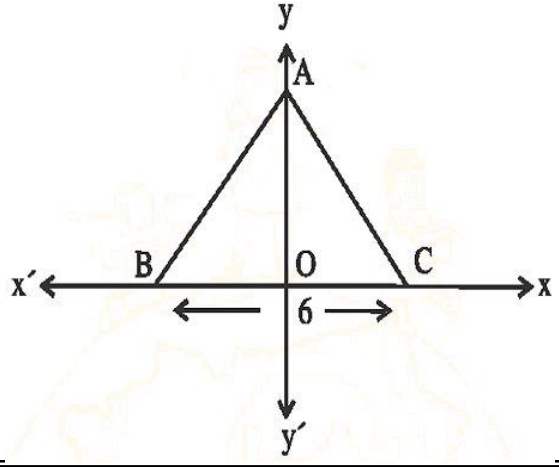
4. From the figure, write the coordinates of the point P, Q, R and S. Does the line joining P and Q pass through origin?



5. Write the coordinates of the following points:
(i) lying on both axes
(ii) lying on x-axis and with x-coordinate 4
(iii) lying on y-axis with y-coordinate –3.

6. The coordinates of the three vertices of a rectangle ABCD are A(3, 2), B(–4, 2), C(–4, 5). Plot these points and write the coordinates of D.

7. ABC is an equilateral triangle as shown in the figure. Find the coordinates of its vertices.



8. Plot the following points on a graph paper:

x	1	2	3	4	5
y	5	8	11	14	17

Join these points. What do you observe?

9. What is the name of horizontal and the vertical lines drawn to determine the position of any point in the Cartesian plane?

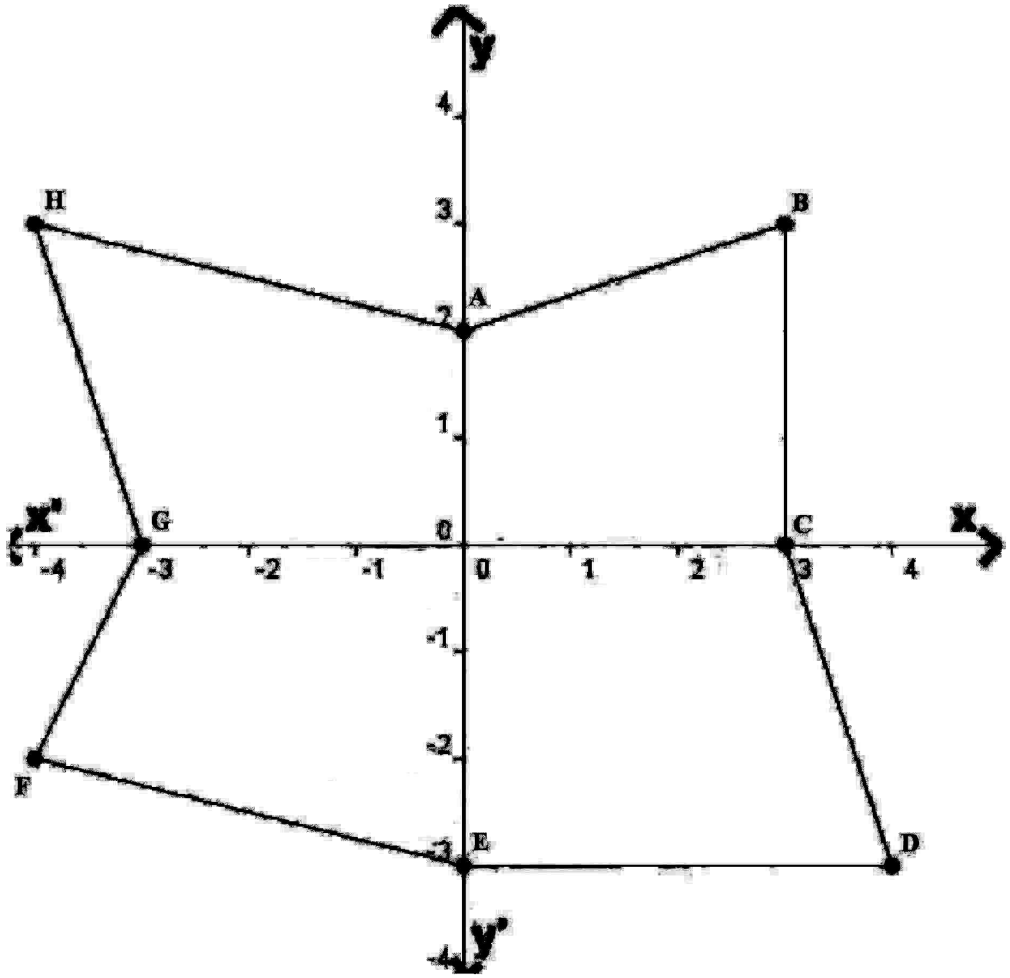
10. What is the name of each part of the plane formed by these two lines?

11. Write the name of the point where these two lines intersect.

12. Locate the points (5, 0), (0, 5), (2, 5), (5, 2), (–3, 5), (–3, –5), (5, –3) and (6, 1) in the Cartesian plane.

13. Draw the line passing through (2, 3) and (3, 2). Find the coordinates of the points at which this line meets the *x*-axis and *y*-axis.

14. Locate the coordinates of labelled points A, B, C, D, E, F, G and H in the following diagram:

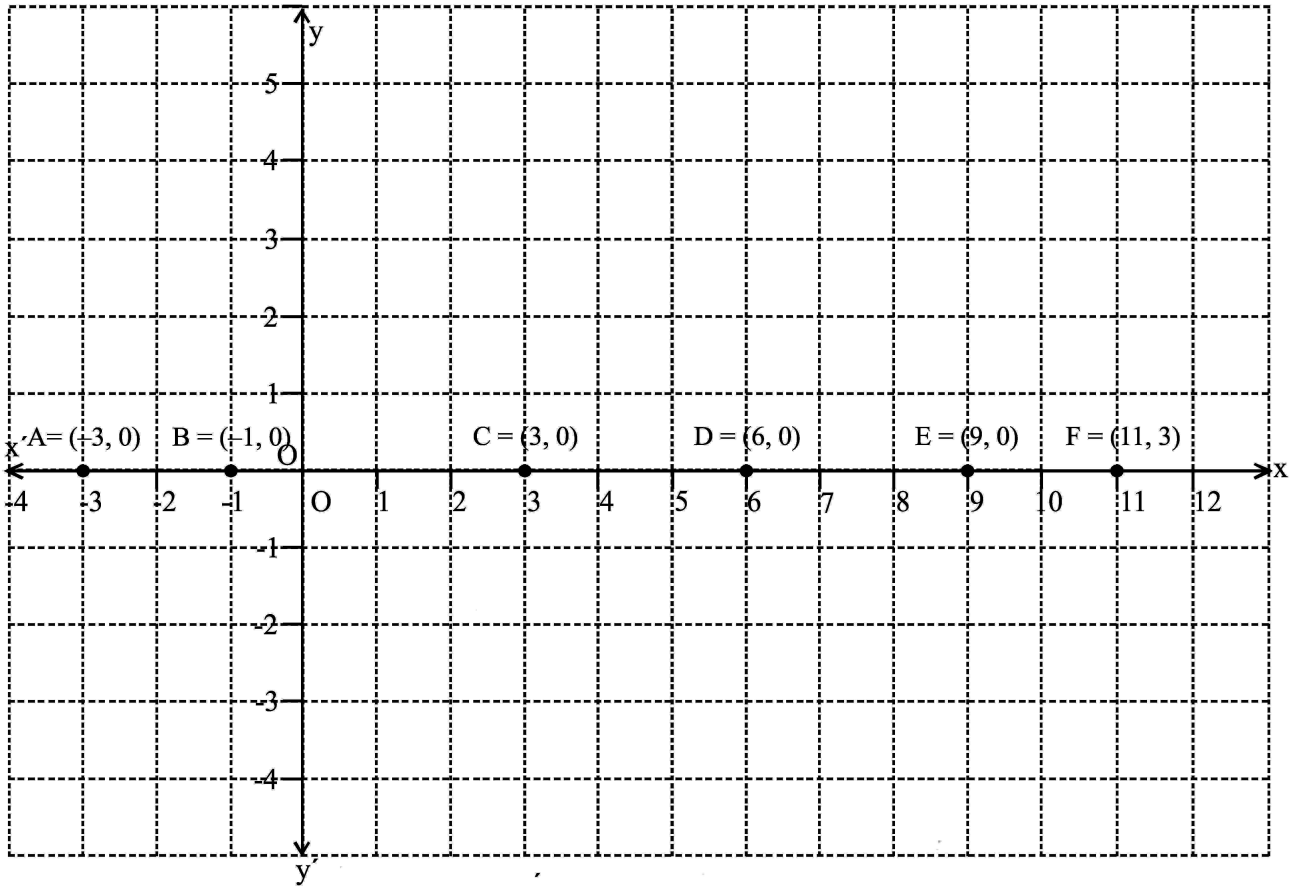


15. Plot the following ordered pairs of number (*x*, *y*) as points in the Cartesian plane. Use the scale 1cm = 1 unit on the axes.

x	–3	0	–1	4	2
y	7	–3.5	–3	4	–3

16. In which quadrant or on which axis do each of the points (– 2, 4), (3, – 1), (– 1, 0), (1, 2) and (– 3, – 5) lie? Verify your answer by locating them on the Cartesian plane.

17. Read the given graph and answer the following questions:



(a) Complete the table given below

Point	Location	Coordinates	Abscissa	Ordinates
A				
B				
C				
D				
E				
F				

(b) What are the coordinates of a general point on the x-axis?

18. Plot the points (x, y) given in the following table on the plane, choosing suitable units of distance on the axes.

x	–1	2	–4	2	–3
y	0	–5	2	1	2

19. Plot the following points and verify if they lie on a line. If they lie on a line, name it.

(i) (0, 2), (0, 5), (0, 6), (0, 3.5) (ii) A (1, 1), B (1, 2), C (1, 3), D (1, 4)

(iii) K (1, 3), L (2, 3), M (3, 3), N (4, 3) (iv) W (2, 6), X (3, 5), Y (5, 3), Z (6, 2)

20. Plot the following points on a graph sheet. Verify if they lie on a line

(a) A(4, 0), B(4, 2), C(4, 6), D(4, 2.5)

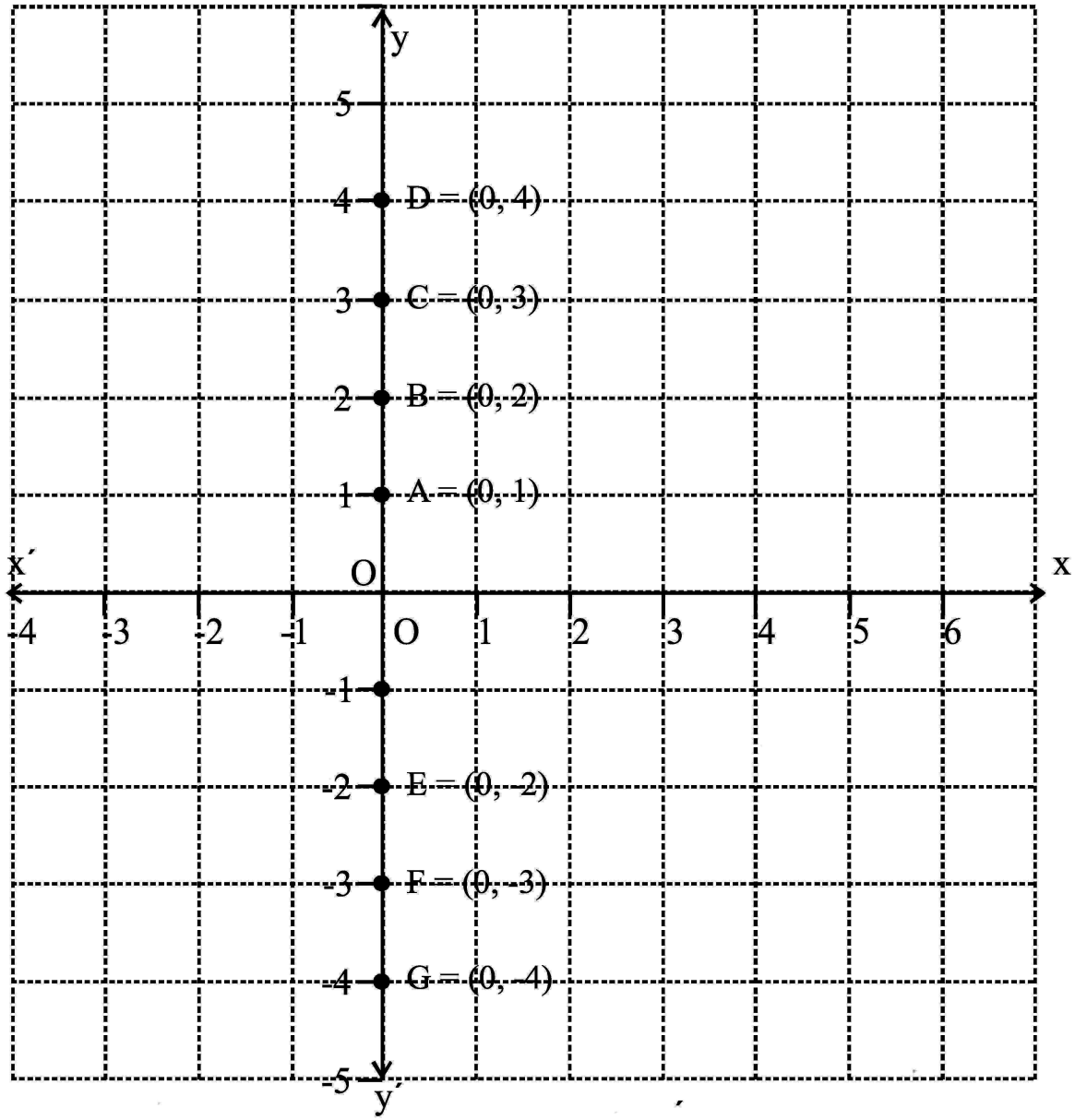
(b) P(1, 1), Q(2, 2), R(3, 3), S(4, 4)

(c) K(2, 3), L(5, 3), M(5, 5), N(2, 5)

21. In which quadrant or on which axis do each of the points (5, 0), (0, 5), (2, 5), (5, 2), (–3, 5), (–3, –5), (5, –3) and (6, 1) in the Cartesian plane.

22. Plot the points A (4, 4) and (–4, 4) on a graph sheet. Join the lines OA, OB and BA. What figure do you obtain.

23. Read the given graph and answer the following questions:



(a) Complete the table given below

Point	Location	Coordinates	Abscissa	Ordinates
A				
B				
C				
D				
E				
F				

(b) What are the coordinates of a general point on the y-axis?

24. Plot the point P (– 6, 2) and from it draw PM and PN as perpendiculars to *x*-axis and *y*-axis, respectively. Write the coordinates of the points M and N.

25. Plot the following points and write the name of the figure thus obtained : P(–3, 2), Q (–7, –3), R (6, –3), S (2, 2)

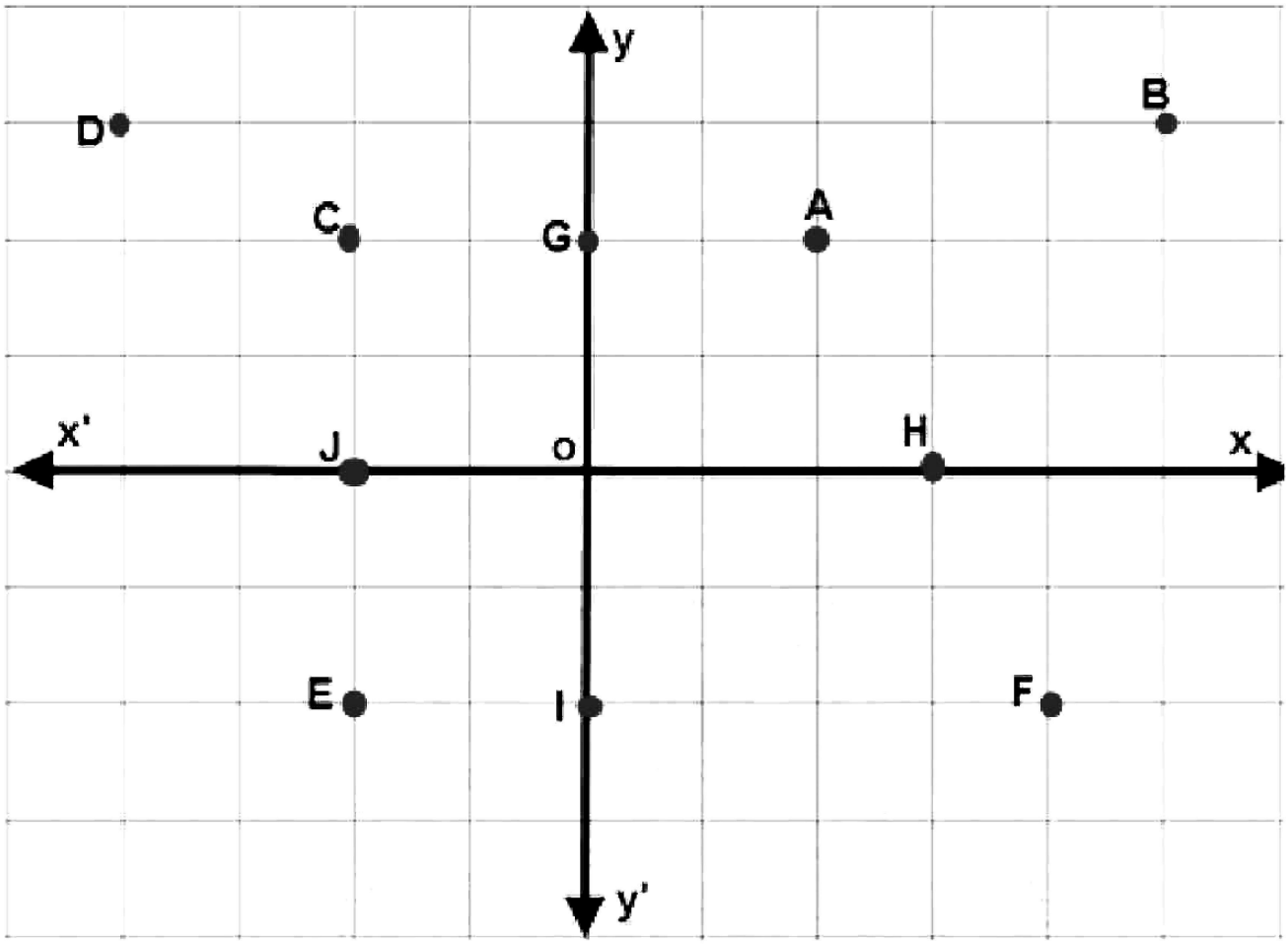
26. Plot the following points and check whether they are collinear or not :

(i) (1, 3), (– 1, – 1), (– 2, – 3)

(ii) (1, 1), (2, – 3), (– 1, – 2)

(iii) (0, 0), (2, 2), (5, 5)

27. Locate the position of marked points.



28. Complete the following table by putting a tick or a cross for the given points and their location.

Point	I quadrant	II quadrant	III quadrant	IV quadrant	x-axis	y-axis
(0, 0)						
(1, 2)						
(1, –2)						
(–2, 1)						
(–1, –2)						
(0, –2)						
(–2, 0)						
(7, 9)						

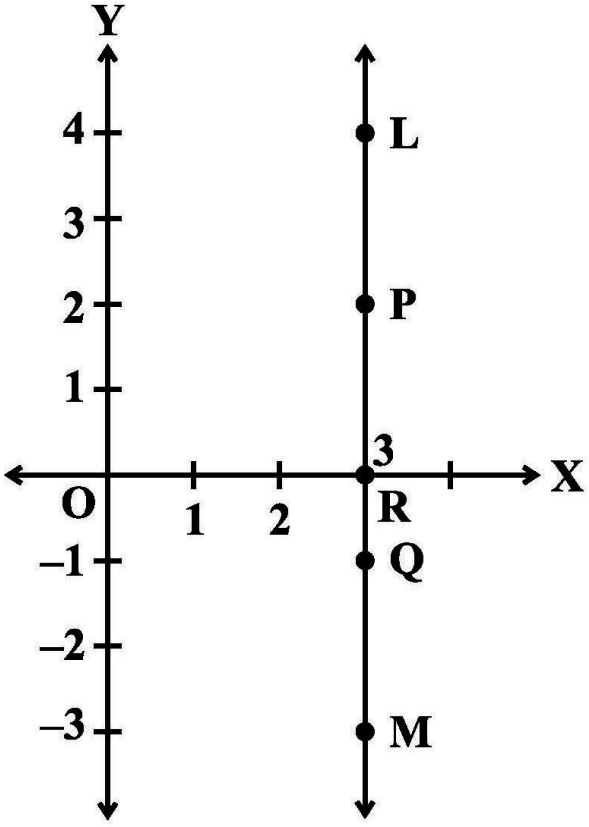
29. Plot the points (x, y) given by the following table:

x	2	4	–3	–2	3	0
y	4	2	0	5	–3	0

30. Without plotting the points indicate the quadrant in which they will lie, if
(i) ordinate is 5 and abscissa is – 3
(ii) abscissa is – 5 and ordinate is – 3
(iii) abscissa is – 5 and ordinate is 3
(iv) ordinate is 5 and abscissa is 3

31. In which quadrant or on which axis each of the following points lie?
(– 3, 5), (4, – 1), (2, 0), (2, 2), (– 3, – 6)

32. In the below Figure, LM is a line parallel to the *y*-axis at a distance of 3 units.
(i) What are the coordinates of the points P, R and Q?
(ii) What is the difference between the abscissa of the points L and M?



33. Which of the following points lie on *y*-axis?
A (1, 1), B (1, 0), C (0, 1), D (0, 0), E (0, – 1), F (– 1, 0), G (0, 5), H (–7, 0), I (3, 3).

34. Plot the points (*x*, *y*) given by the following table. Use scale 1 cm = 0.25 units

x	1.25	0.25	1.5	–1.75
y	–0.5	1	1.5	–0.25

35. A point lies on the *x*-axis at a distance of 7 units from the *y*-axis. What are its coordinates? What will be the coordinates if it lies on *y*-axis at a distance of –7 units from *x*-axis?

36. Find the coordinates of the point
(i) which lies on *x* and *y* axes both.
(ii) whose ordinate is – 4 and which lies on *y*-axis.
(iii) whose abscissa is 5 and which lies on *x*-axis.

37. Taking 0.5 cm as 1 unit, plot the following points on the graph paper : A (1, 3), B (– 3, – 1), C (1, – 4), D (– 2, 3), E (0, – 8), F (1, 0)

38. Plot the points P (1, 0), Q (4, 0) and S (1, 3). Find the coordinates of the point R such that PQRS is a square.

39. Three vertices of a rectangle are (3, 2), (– 4, 2) and (– 4, 5). Plot these points and find the coordinates of the fourth vertex.

40. Three vertices of a rectangle are (4, 2), (– 3, 2) and (– 3, 7). Plot these points and find the coordinates of the fourth vertex.

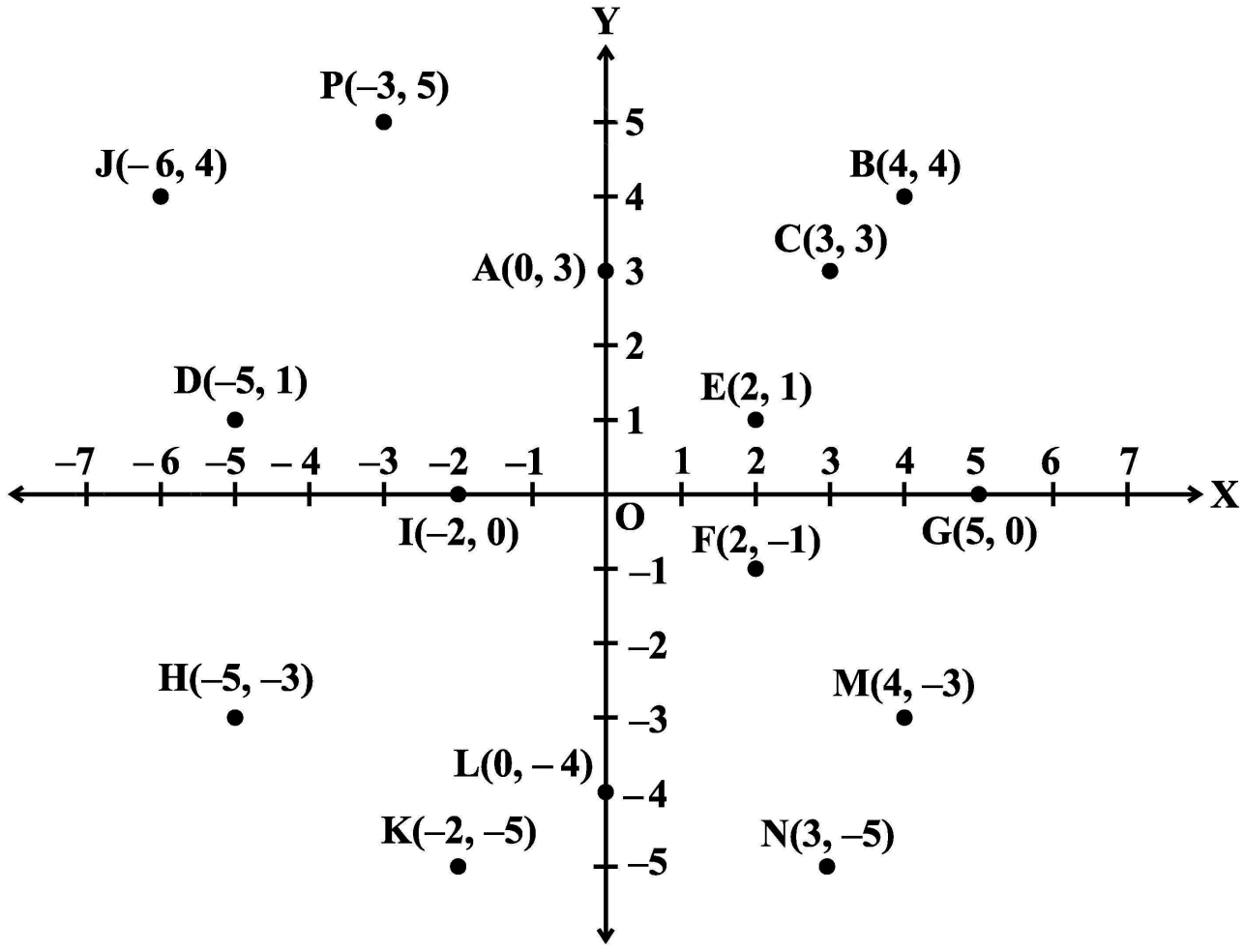
41. Points A (5, 3), B (– 2, 3) and D (5, – 4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.

42. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the *x*-axis and one of the vertices lies in the third quadrant.

43. Plot the points A (1, – 1) and B (4, 5) (i) Draw a line segment joining these points. Write the coordinates of a point on this line segment between the points A and B. (ii) Extend this line segment and write the coordinates of a point on this line which lies outside the line segment AB.

44. Plot the points P (0, –3), Q (0, 3) and R (6, 3). Find the coordinates of the point S such that PQRS is a square.

45. From the below graph, answer the following : (i) Write the points whose abscissa is 0. (ii) Write the points whose ordinate is 0. (iii) Write the points whose abscissa is – 5.



MCQ WORKSHEET-I
CLASS IX: CHAPTER - 5
INTRODUCTION TO EUCLID'S GEOMETRY

1. The number of dimensions, a solid has:
(a) 1 (b) 2 (c) 3 (d) 0

2. The number of dimensions, a surface has:
(a) 1 (b) 2 (c) 3 (d) 0

3. The number of dimensions, a point has:
(a) 1 (b) 2 (c) 3 (d) 0

4. The three steps from solids to points are:
(a) solids – surfaces – lines – points
(b) solids – lines – surfaces – points
(c) lines – points – surfaces - solids
(d) lines – surface – points – solids

5. Euclid's division his famous treatise "The Elements" into _____ chapters:
(a) 13 (b) 12 (c) 11 (d) 9

6. The total number of propositions in the Elements are:
(a) 465 (b) 460 (c) 13 (d) 55

7. Boundaries of solids are:
(a) surfaces (b) curves (c) lines (d) points

8. Boundaries of surfaces are:
(a) surfaces (b) curves (c) lines (d) points

9. A pyramid is solid figure, the base of which is:
(a) only a triangle (b) only a square
(c) only a rectangle (d) any polygon

10. In Indus valley civilization (about 300 B. C.) the bricks used for construction work were having dimensions in the ratio :
(a) 1 : 3 : 4 (b) 4 : 2 : 1 (c) 4 : 4 : 1 (d) 4 : 3 : 2

11. The side faces of a pyramid are
(a) triangles (b) squares (c) polygons (d) trapeziums

12. Thales belongs to the country:
(a) Bablyonia (b) Egypt (c) Greece (d) Rome.

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 5
INTRODUCTION TO EUCLID'S GEOMETRY

1. Pythagoras was a student of:
(a) Thales (b) Euclid (c) Both (a) and (b) (d) Archimedes.

2. Euclid belongs to the country:
(a) Bablyonia (b) Egypt (c) Greece (d) Rome.

3. It is known that if $x + y = 10$ then $x + y + z = 10 + z$. The Euclid's axiom that illustrates this statement is:
(a) 1^{st} Axiom (b) 2^{nd} Axiom (c) 3^{rd} Axiom (d) 4^{th} Axiom

4. In ancient India, the shapes of altrars used for house hold rituals were:
(a) Squares and circles
(b) Triangles and rectangles
(c) Trapeziums and pyramids
(d) Rectangles and squares

5. The number of interwoven isosceles triangles in Sriyantras (in the Atharvaveda) is:
(a) 7 (b) 8 (c) 9 (d) 11

6. Greek's emphasized on:
(a) Inductive reasoning (b) Deductive reasoning
(c) Both (a) and (b) (d) Practical use of geometry

7. In ancient India, Altrars with combination of shapes like rectangles, triangles and trapeziums were used for:
(a) Public worship (b) Household rituals
(c) Both (a) and (b) (d) None of these

8. Which of the following needs a proof?
(a) Theorem (b) Axiom (c) Definition (d) Postulate

9. Two distinct lines cannot have more than ____ point in common
(a) 1 (b) 2 (c) 3 (d) infinite

10. A _____ may be drawn from any one point to any other point
(a) solid (b) plane surface
(c) straight line (d) none of these

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 5
INTRODUCTION TO EUCLID'S GEOMETRY

1. According to Euclid's definition, the ends of a line are
(a) breadthless (b)points (c)lengthless (d) none of these

2. According to listing in the class IX book of NCERT, the first axiom is
(a) Things which are equal to the same thing, are equal to each other

(b) If equal are added to equals, the result are equal

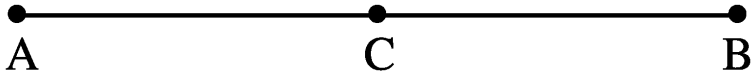
(c) If equals are subtracted from equals, the results are equal

(d) The whole is greater than its part.

3. Things which are three times of the same thing are
(a) equal to each other (b) not equal to each other
(c) half of the same thing (d) double of the same thing

4. A solid has
(a) no dimension (b) one dimension
(c)two dimension (d) three dimension

5. If a point C lies between two points A and B such that AC = BC, then



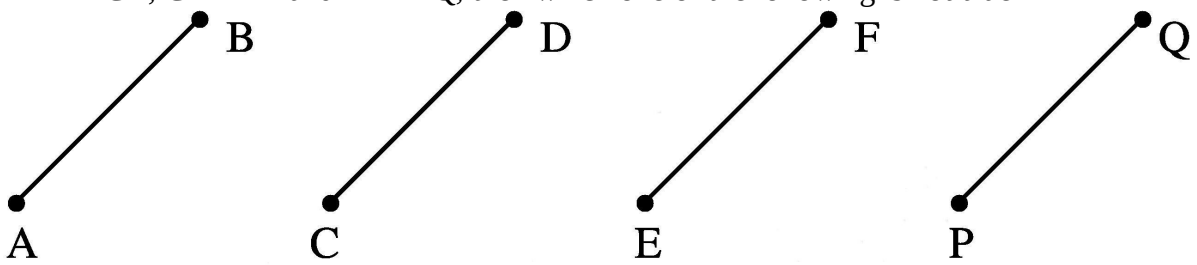
(a) AC = AB (b) AC = $\frac{1}{2}$AB (c) AB = $\frac{1}{2}$AC (d) AC= $\frac{1}{3}$AB

6. $\angle A = \angle B$ and $\angle B = \angle C$. According to which axiom of Euclid the relation between $\angle A$ and $\angle C$ is established?
(a) I (b) II (c) III (d) IV

7. Two distinct two points
(a) any point in common (b) one point in common
(c)two points in common (d) none of the these

8. Through two points
(a) no line can be drawn (b) a unique line can be drawn
(c) more than one line can be drawn (d) none of these

9. If AB = CD, CD = EF and EF = PQ, then which one of the following is not true



(a)AB = PQ (b)CD = PQ (c) AB = EF (d) AB ≠ CD

10. For every line l and for every point P (not on l), there does not exist a unique line through P.
(a) which is || to l (b)which is ⊥ to l (c) which is coincident with l (d) none of these

11. Euclid stated that all right angles are equal to each other in the form of
(a) a theorem (b) an axiom (c) a definition (d) a postulate

12. Lines are parallel if they do not intersect is stated in the form of
(a) a proof (b) an axiom (c) a definition (d) a postulate

13. Euclid stated that all right angles are equal to each other in the form of
(a) an axiom (b) a definition (c) a postulate (d) a proof

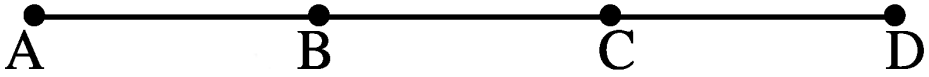
14. 'Lines are parallel if they do not intersect' is stated in the form of
(a) an axiom (b) a definition (c) a postulate (d) a proof

PRACTICE QUESTIONS
CLASS IX: CHAPTER - 5
INTRODUCTION TO EUCLID'S GEOMETRY

1. What was name of the famous book of Euclid? How many chapters it had?

2. It is known that x + y =10. Is it true to say that x + y + p = 10 + p ?

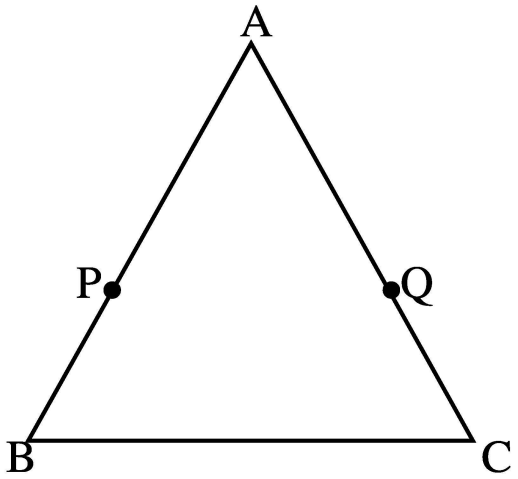
3. If AB = CD, can you say that AC = BD? Give reasons for your answer.



4. If $\angle 1 = \angle 2$, $\angle 3 = \angle 4$ and $\angle 2 = \angle 4$, what is the relation between $\angle 1$ and $\angle 2$. Give reasons for your answer.

5. If AB = 4 cm, CD = 8cm and PQ = 2 times AB. Are CD and Pq equal? Which axiom is used for proving this?

6. AB = AC and AP = AQ. Can you say that BP = CQ? Which axioms are you using for this?



7. l = 3 cm long and lengths of lines m and n are three-fourth the length of l. Are m and n equal?

8. How would you rewrite Euclid's fifth postulate so that it would be easier to understand?

9. Does Euclid's fifth postulate imply the existence of parallel lines? Explain.

10. Consider the following statement : There exists a pair of straight lines that are everywhere equidistant from one another. Is this statement a direct consequence of Euclid's fifth postulate? Explain.

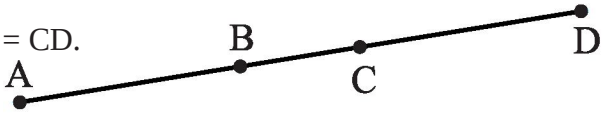
11. If A, B and C are three points on a line, and B lies between A and C, then prove that AB + BC = AC.

12. Prove that an equilateral triangle can be constructed on any given line segment.

13. If a point C lies between two points A and B such that AC = BC, then prove that AC = $\frac{1}{2}$ AB.

Explain by drawing the figure.

14. In adjoining figure, if AC = BD, then prove that AB = CD.

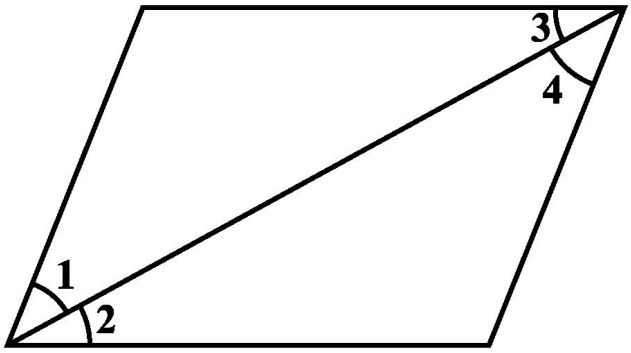


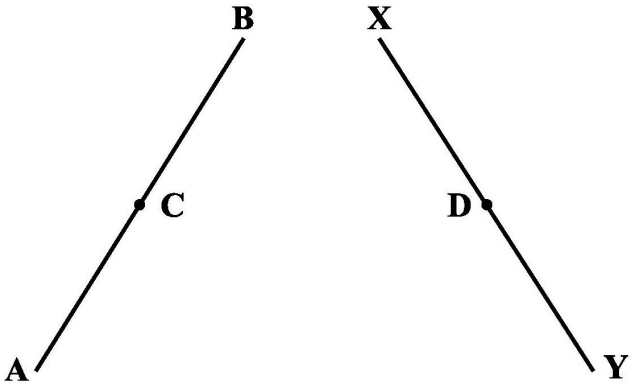
15. If a point C is called a mid-point of line segment AB. Prove that every line segment has one and only one mid-point.

16. Ram and Ravi have the same weight. If they each gain weight by 2 kg, how will their new weights be compared?

17. Solve the equation $a - 15 = 25$ and state which axiom do you use here.

18. In the Fig., if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, write the relation between $\angle 1$ and $\angle 2$, using an Euclid's axiom.



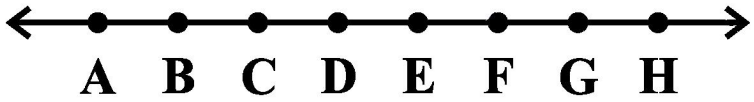


19. In the above right sided Figure, we have : AC = XD, C is the mid-point of AB and D is the mid-point of XY. Using an Euclid's axiom, show that AB = XY.

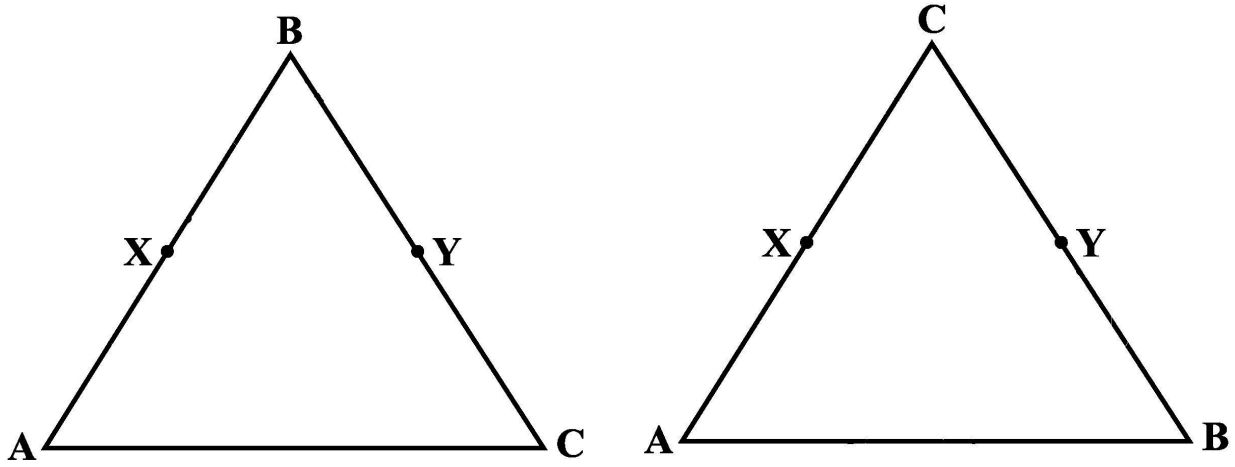
20. Solve using appropriate Euclid's axiom: "Two salesmen make equal sales during the month of August. In September, each salesman doubles his sale of the month of August. Compare their sales in September."

21. Solve using appropriate Euclid's axiom: It is known that $x + y = 10$ and that $x = z$. Show that $z + y = 10$?

22. Solve using appropriate Euclid's axiom: Look at the below Figure. Show that length AH > sum of lengths of AB + BC + CD.



23. Solve using appropriate Euclid's axiom : In the below Figure, we have AB = BC, BX = BY. Show that AX = CY.



24. Solve using appropriate Euclid's axiom : In the above right sided Figure, we have X and Y are the mid-points of AC and BC and AX = CY. Show that AC = BC.

MCQ WORKSHEET-I
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. If a ray stands on a line then the sum of the adjacent angles so formed is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

2. The sum of all the angles around a point is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

3. The sum of all the angles formed on the same side of a line at a given point on the line is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

4. The angle which is four times its complement is
(a) 60^0 (b) 30^0 c) 45^0 (d) 72^0

5. The angle which is five times its supplement is
(a) 150^0 (b) 180^0 c) 90^0 (d) 360^0

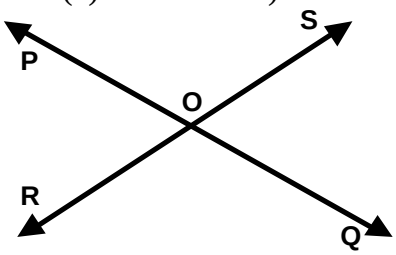
6. The measure of an angle which is equal to its complement is
(a) 60^0 (b) 30^0 c) 45^0 (d) 15^0

7. The measure of an angle which is equal to its supplement is
(a) 100^0 (b) 75^0 c) 90^0 (d) 60^0

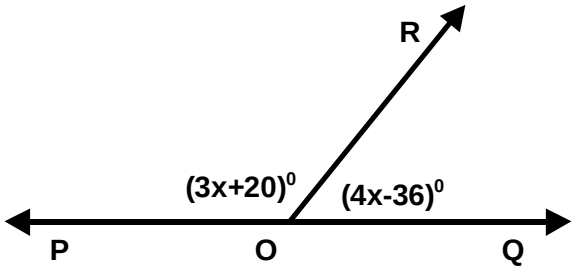
8. If two parallel lines are intersected by a transversal, then the bisectors of the two pairs of interior angles enclose
(a) a square (b) a rectangle c) a parallelogram (d) a trapezium

9. Two adjacent angles on a straight line are in the ratio 5 : 4. then the measure of each one of these angles are
(a) 100^0 and 80^0 (b) 75^0 and 105^0 c) 90^0 and 90^0 (d) 60^0 and 120^0

10. Two lines PQ and RS intersect at O. If $\angle POR = 50^0$, then value of $\angle ROQ$ is
(a) 120^0 (b) 130^0 c) 90^0 (d) 150^0



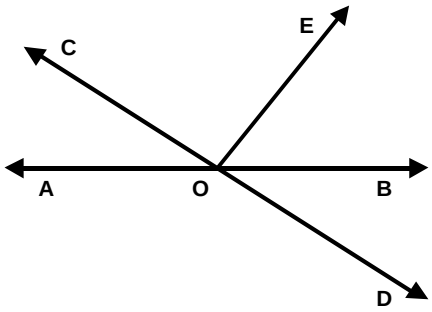
11. In the adjoining figure the value of x is
(a) 25^0 (b) 28^0 c) 30^0 (d) 60^0



12. If two straight lines intersect each other in such a way that one of the angles so formed measure 90^0, then each of the remaining angles measures is
(a) 50^0 (b) 75^0 c) 90^0 (d) 60^0

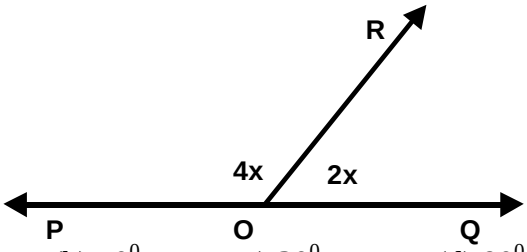
MCQ WORKSHEET-II
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. In fig. AB and CD intersect each other at O. If $\angle AOC + \angle BOE = 70^0$ and $\angle BOD = 40^0$ then the value of $\angle BOE$ is



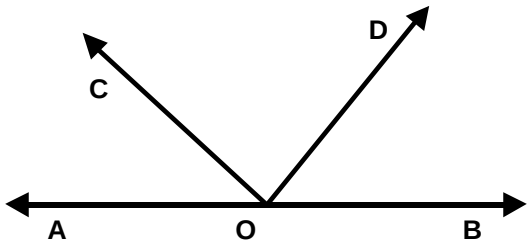
(a) 30^0 (b) 110^0 c) 120^0 (d) 150^0

2. In fig. POQ is a line, $\angle POR = 4x$ and $\angle QOR = 2x$ then the value of x is



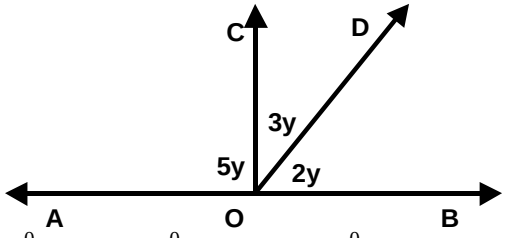
(a) 50^0 (b) 20^0 c) 30^0 (d) 90^0

3. In the given fig. $\angle AOC + \angle BOD = 75^0$, then the value of $\angle COD$ is



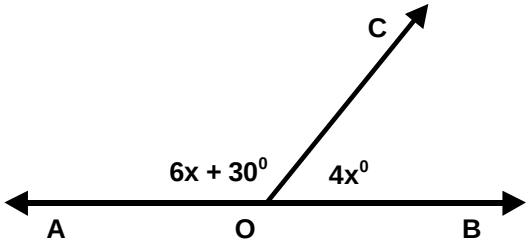
(a) 130^0 (b) 105 c) 120^0 (d) 75^0

4. In the fig. the value of y is:



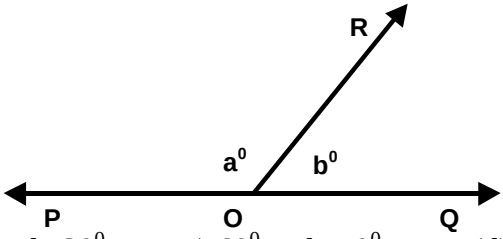
(a) 60^0 (b) 18^0 c) 30^0 (d) 90^0

5. In fig., the value of x is:



(a) 60^0 (b) 15^0 c) 30^0 (d) 45^0

6. In fig. $\angle POR$ and $\angle QOR$ form a linear pair if $a - b = 80^0$ then values of a and b respectively are:

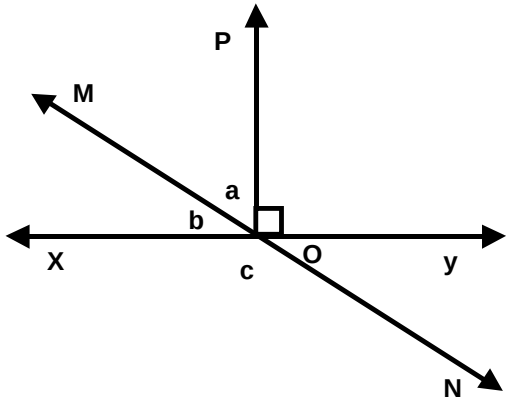


(a) 130^0 and 50^0 (b) 50^0 and 130^0 c) 60^0 and 120^0 (d) 40^0 and 140^0

7. For two parallel lines sum of interior angles on the same side of a transversal line is
(a) 100^0 (b) 180^0 c) 90^0 (d) 360^0

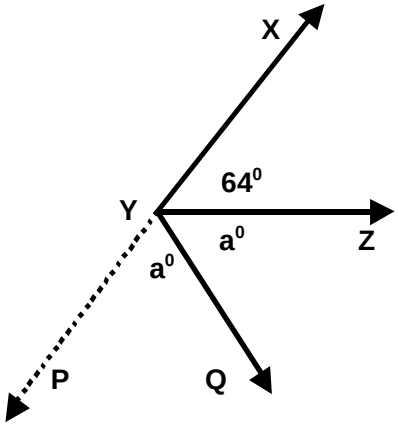
8. In fig., lines XY and MN intersect each other at point O. If $\angle POY = 90^0$ and a : b = 2 : 3 then the value of $\angle C$ is

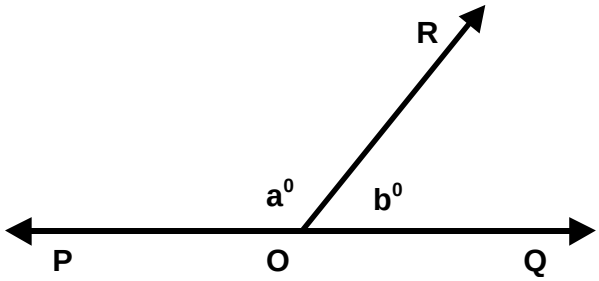
(a) 140^0 (b) 120^0 c) 80^0 (d) 95^0



9. In fig. $\angle XYZ = 640$ and XY is produced to point P. If ray YQ bisect $\angle ZYP$ then the value of $\angle XYQ$ is

(a) 122^0 (b) 126^0 c) 302^0 (d) 258^0

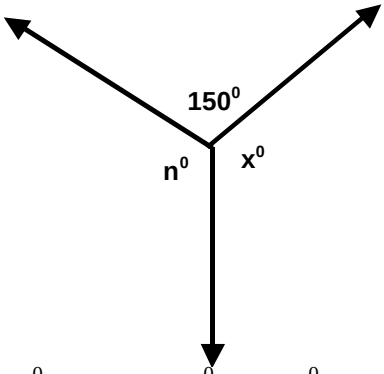




10. In fig., b is more than one-third of a right angle than a. The values of a and b are:

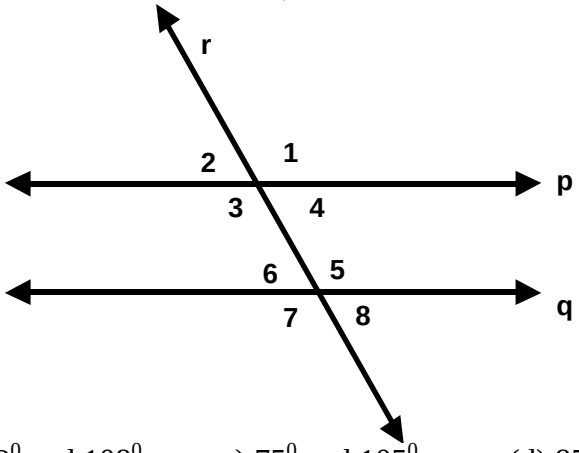
(a) 95^0 and 85^0 (b) 105^0 and 75^0 c) 60^0 and 120^0 (d) 65^0 and 115^0

11. In fig., $n - x = 3^0$ then values of x and n are:



(a) 126^0 and 129^0 (b) 125^0 and 28^0 c) 150^0 and 95^0 (d) 135^0 and 65^0

12. In fig., q || r and p is transversal. If $\angle 1$ and $\angle 2$, 3 : 2 then the values of $\angle 3$ and $\angle 4$ are:

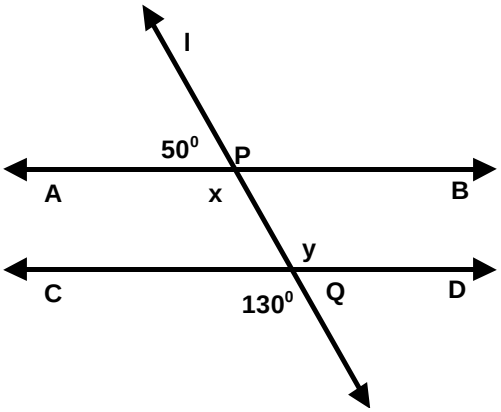


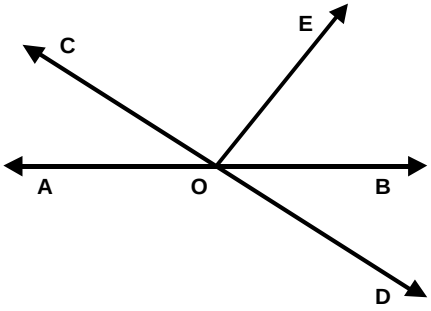
(a) 108^0 and 72^0 (b) 72^0 and 108^0 c) 75^0 and 105^0 (d) 85^0 and 95^0

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. In fig. the values of x and y are equal to:

(a) 130^0 (b) 150^0 c) 160^0 (d) 135^0

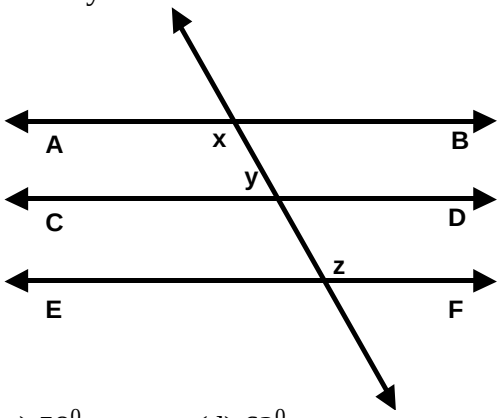




2. In fig. AB and CD intersect each other at O. If $\angle AOC + \angle BOE = 70^0$ and $\angle BOD = 40^0$ then the value of $\angle COE$ is

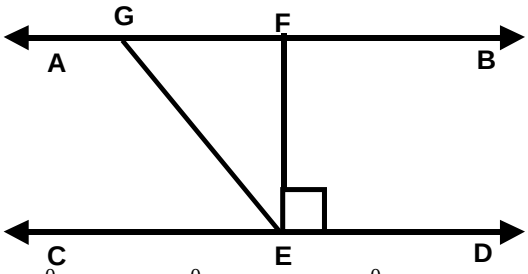
(a) 250^0 (b) 70^0 c) 30^0 (d) 50^0

3. In fig, if AB || CD, CD || EF and y : z = 3 : 7 then value of x is:



(a) 126^0 (b) 120^0 c) 58^0 (d) 62^0

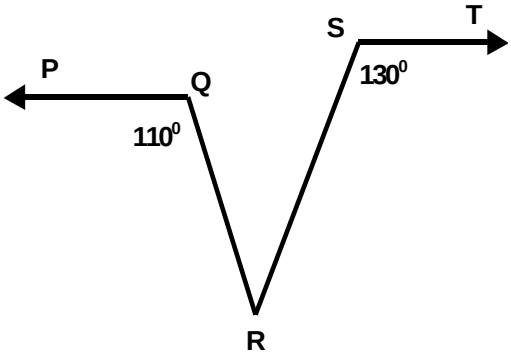
4. In fig, if AB || CD, EF ⊥ CD and $\angle GED = 126^0$ then the value of $\angle AGE$ is



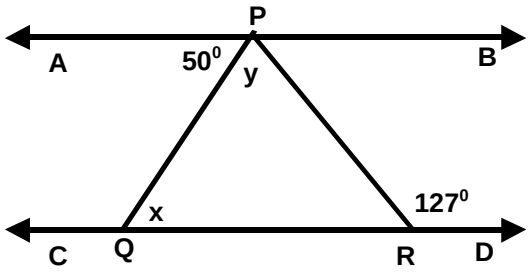
(a) 126^0 (b) 120^0 c) 128^0 (d) 54^0

5. In fig, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$ then the value of $\angle QRS$ is

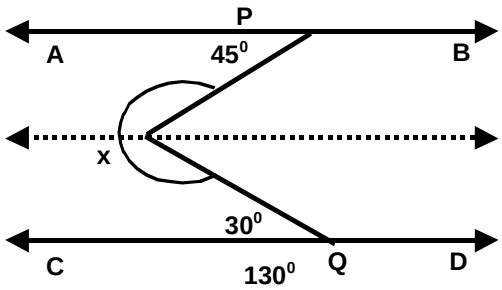
(a) 60^0 (b) 120^0 c) 80^0 (d) 90^0



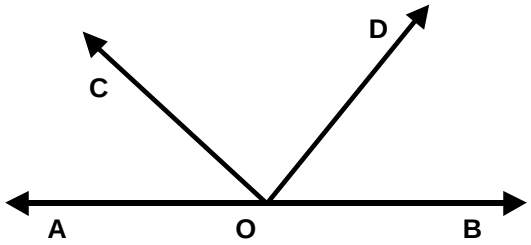
6. In fig., AB || CD, $\angle APQ = 50^0$, $\angle PRD = 127^0$, then the value of x and y respectively are
(a) 50^0 and 77^0 (b) 40^0 and 85^0 c) 60^0 and 90^0 (d) 85^0 and 75^0



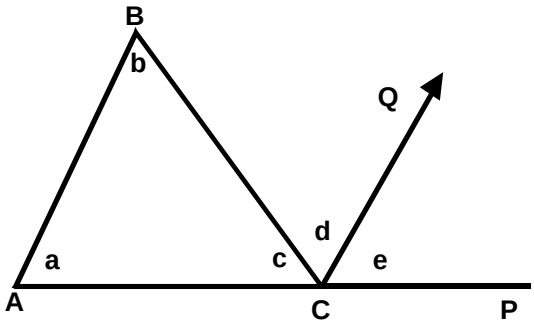
7. In fig, AB || CD, the value of x is:
(a) 185^0 (b) 280^0 c) 285^0 (d) 195^0



8. In fig, if $\angle AOC$, $\angle COD$ are equal and $\angle BOD$ is a right angle, then the values of $\angle AOC$ and $\angle COD$ are:
(a) 60^0 (b) 30^0 c) 45^0 (d) 90^0



9. In fig, the sum of $\angle a$ and $\angle b$ is:
(a) $\angle c + \angle d$ (b) $\angle d + \angle e$
(c) $\angle b + \angle c$ (d) $\angle a + \angle c$



10. In triangle interior opposite angle is always less than:
(a) any angle of the triangle (b) opposite angle
(c) right angle (d) exterior angle

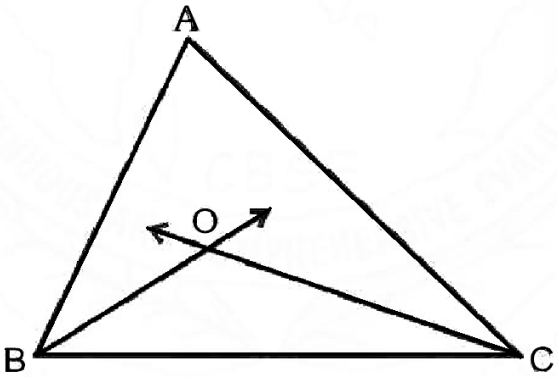
11. In a triangle sum of two interior opposite angles is always equal to:
(a) third angle (b) opposite angle
(c) right angle (d) none of these

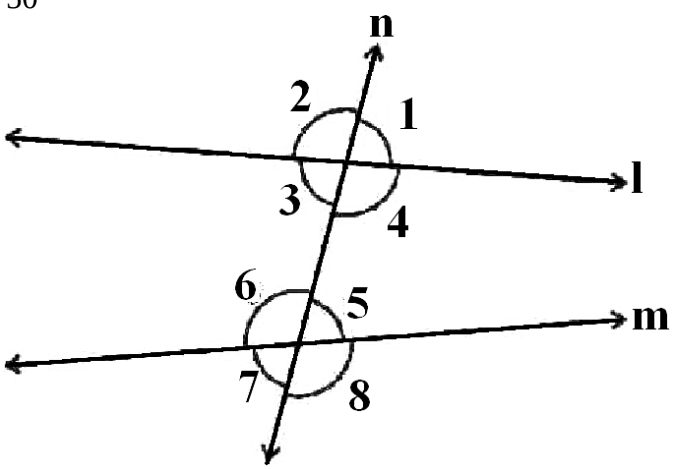
12. In a triangle exterior angle is always greater than:
(a) third angle (b) interior opposite angles
(c) right angle (d) none of these

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 6
LINES AND ANGLES

1. What is the common between the three angles of a triangle and a linear pair
(a) angles are equal (b) in both cases sum of angle is 180^0.
(c) In triangle there are three angles and in linear pair there are two angles (d) none of these.

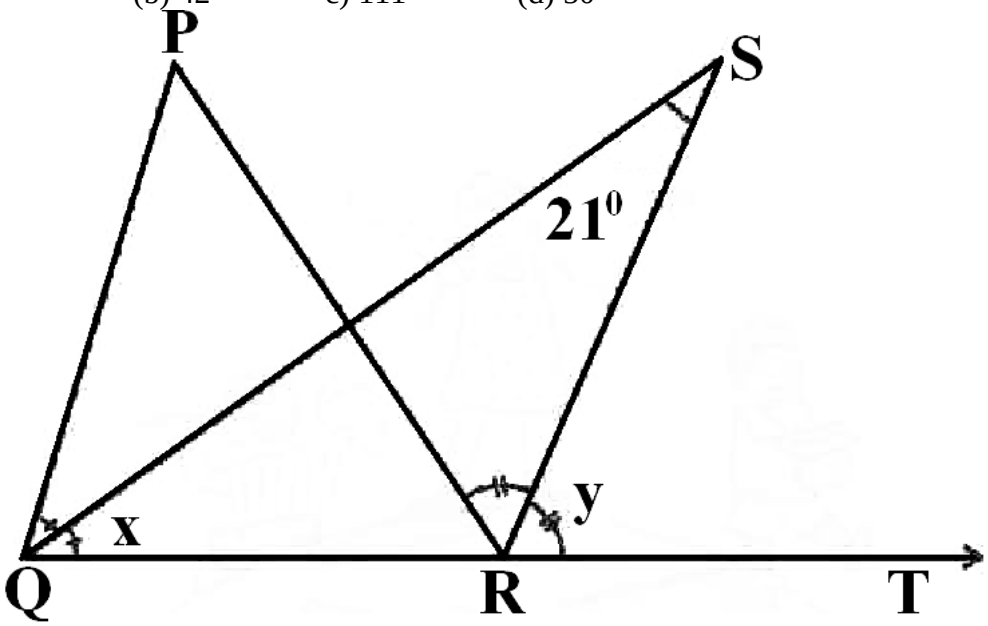
2. In the given below left figure, the bisectors of $\angle ABC$ and $\angle BCA$, intersect each other at point O. If $\angle BOC = 100^0$, the $\angle A$ is
(a) 30^0 (b) 20^0 c) 40^0 (d) 50^0





3. In the given above right sided figure, $\angle 2$ and $\angle 8$ are known as
(a) exterior angles (b) exterior angles on the same side of transversal.
(c) alternate angles (d) alternate exterior angles.

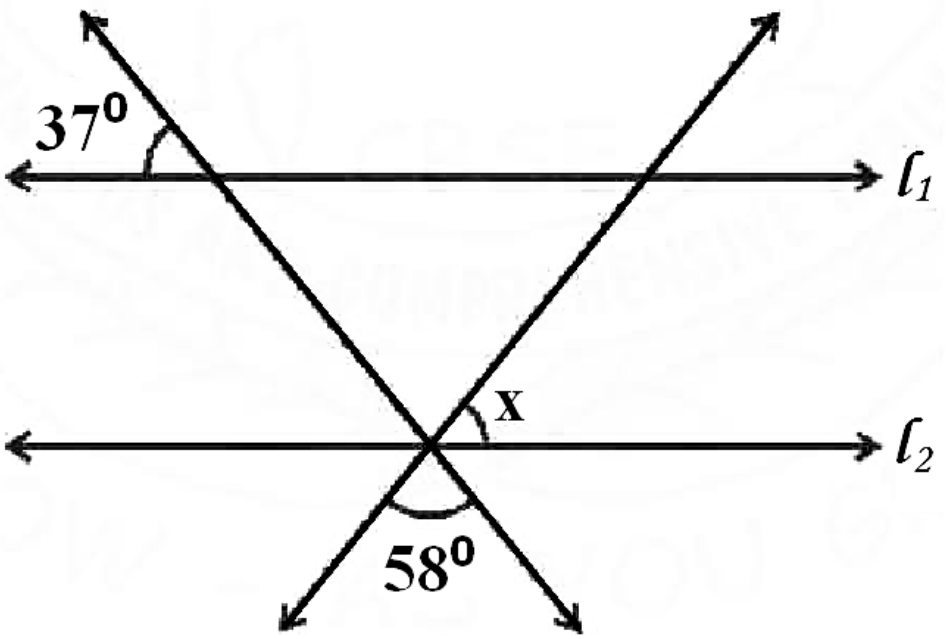
4. In the given figure, measure of $\angle QPR$ is
(a) 10.5^0 (b) 42^0 c) 111^0 (d) 50^0



5. An angle is 200 more than three times the given angle. If the two angles are supplementary the angles are
(a) 20^0 and 160^0 (b) 40^0 and 140^0 c) 60^0 and 120^0 (d) 70^0 and 110^0

6. In figure, if $l_1 \parallel l_2$, what is the value of x

(a) 90^0 (b) 85^0 c) 75^0 (d) 70^0



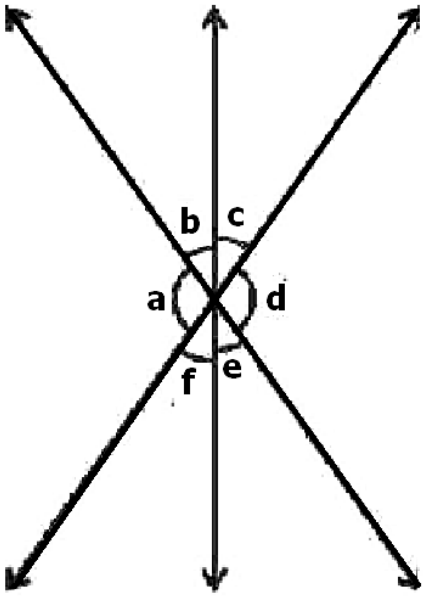
7. If a wheel has six spokes equally spaced, then the measure of the angle between two adjacent spokes is

(a) 90^0 (b) 30^0 c) 60^0 (d) 180^0

8. In figure, which of the following statements must be true?

(i) a + b = d + c (ii) $a + c + e = 180^0$ (iii) b + f = c + e

(a) (i) only (b) (ii) only c) (iii) only (d) (ii) and (iii) both



9. The angle which is two times its complement is

(a) 60^0 (b) 30^0 c) 45^0 (d) 72^0

10. The angle which is two times its supplement is

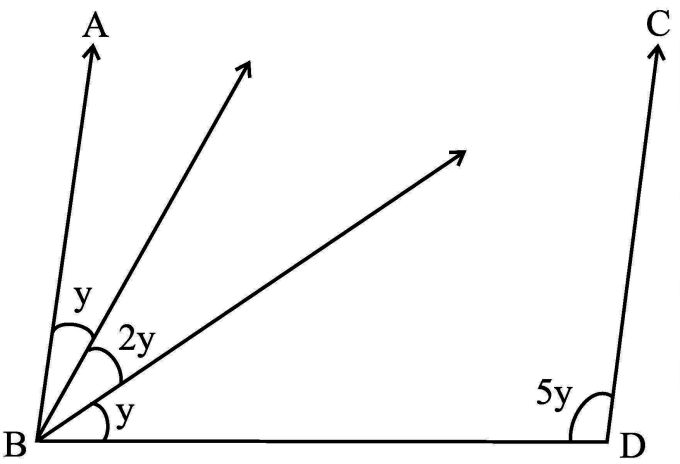
(a) 150^0 (b) 60^0 c) 90^0 (d) 120^0

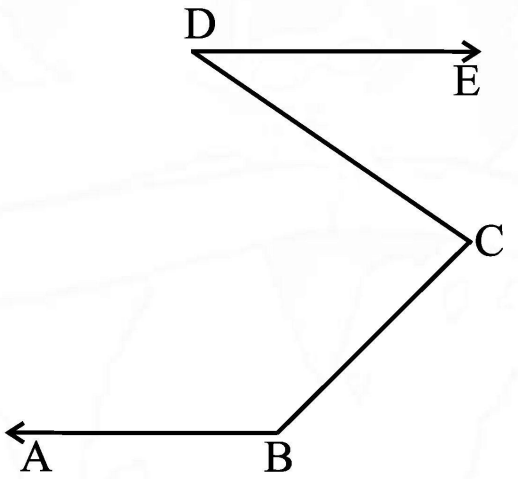
PRACTICE QUESTIONS

CLASS IX: CHAPTER - 6

LINES AND ANGLES

1. In the figure, if AB || CD, then what is the value of y.





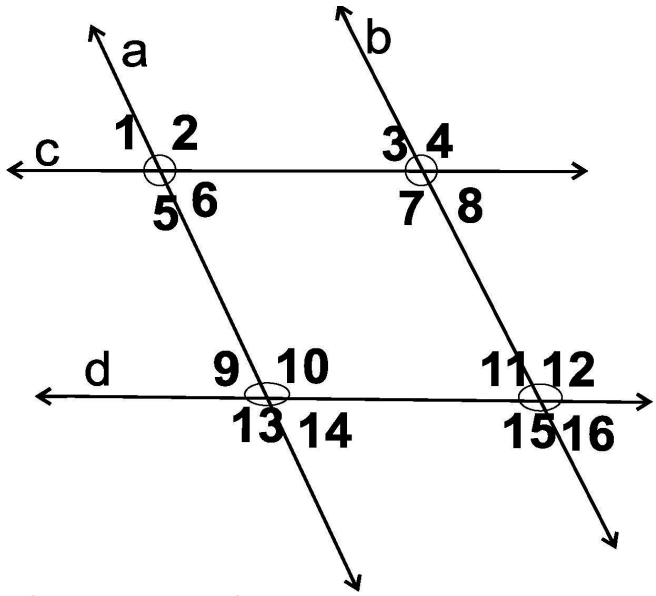
2. In the given above right sided figure, BA || DE. Prove that $\angle ABC + \angle BCD = 180^0 + \angle CDE$

3. In the given figure a || b and c || d.

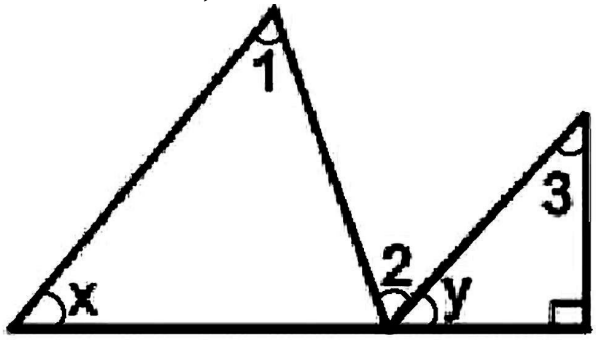
(i) Name all the angles equal to $\angle 5$. Justify the your answer

(ii) Name all angles supplementary to $\angle 8$. Justify the your answer

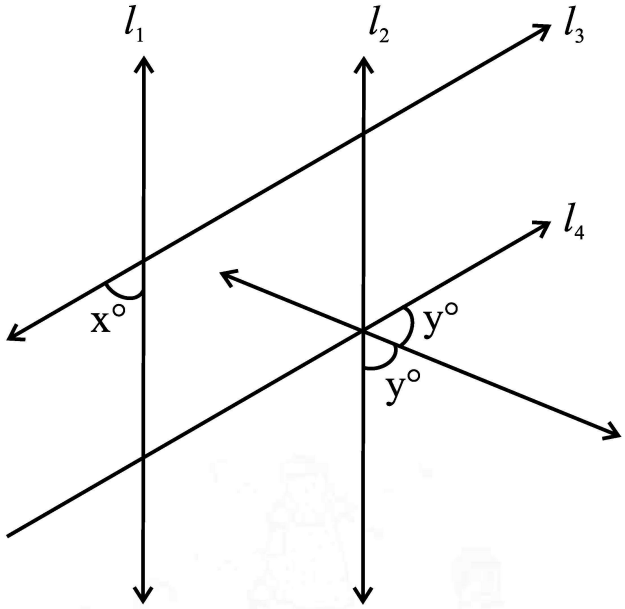
(iii) If $\angle 4 = 110^0$, then find all other angles. What all properties of parallel lines you have used here?



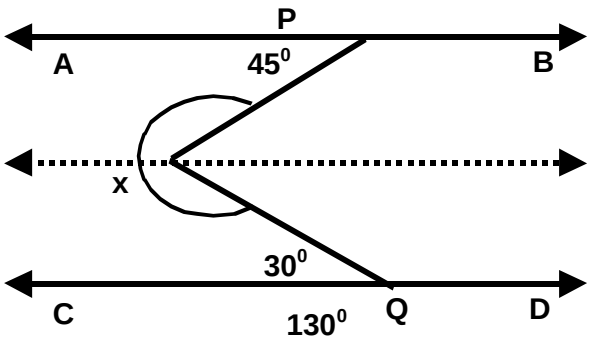
4. If $m\angle 1=53^0$, $m\angle 2 = 65^0$ and $m\angle 3 = 43^0$, find the measures of $\angle x$ and $\angle y$. Justify your answer.



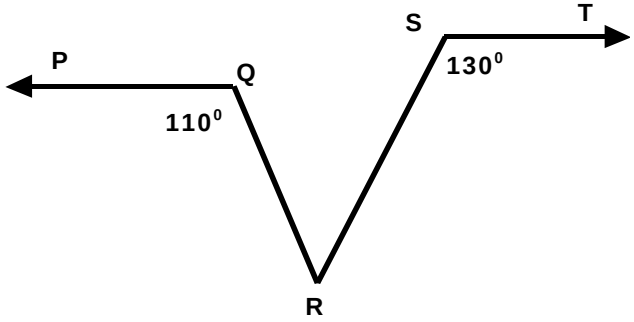
5. In figure, if $l_1 \parallel l_2$ and $l_3 \parallel l_4$. What is y in terms of x?



6. In fig, find the value of x



7. In fig, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$ then find the value of $\angle QRS$.



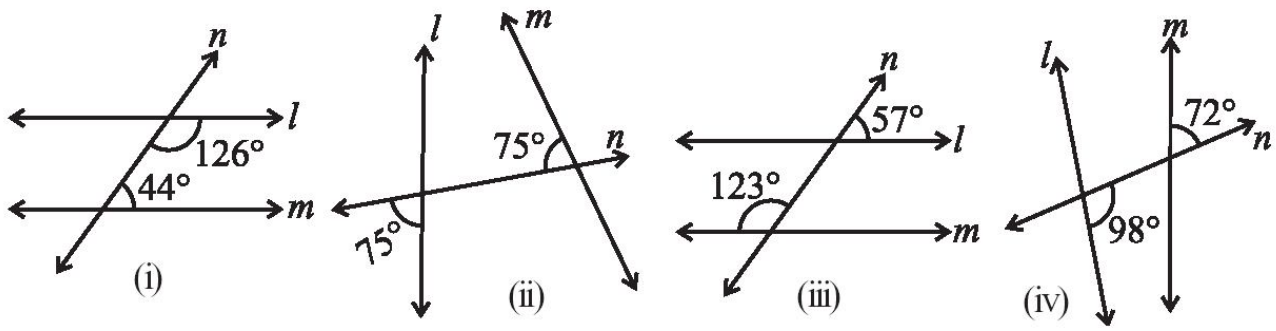
8. An angle is greater than 45º. Is its complementary angle greater than 45º or equal to 45º or less than 45º?

9. Prove that "The sum of all interior angles of a triangle is 180^0".

10. One of the angles of a triangle is 80º and the other two angles are equal. Find the measure of each of the equal angles.

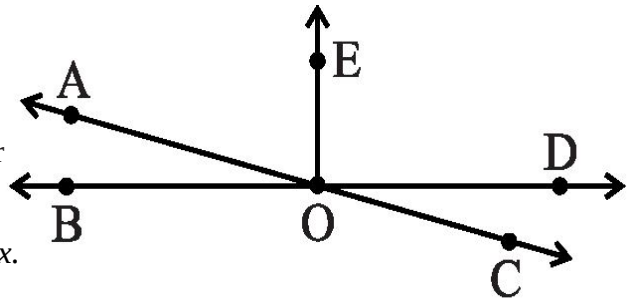
11. The three angles of a triangle are in the ratio 1:2:1. Find all the angles of the triangle.

12. In the given figures below, decide whether l is parallel to m.

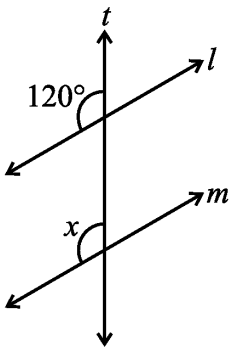


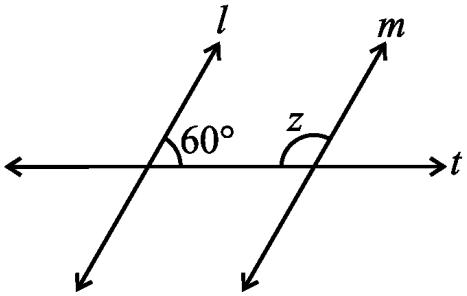
13. In the adjoining figure, name the following pairs of angles.

(i) Obtuse vertically opposite angles
(ii) Adjacent complementary angles
(iii) Equal supplementary angles
(iv) Unequal supplementary angles
(v) Adjacent angles that do not form a linear pair



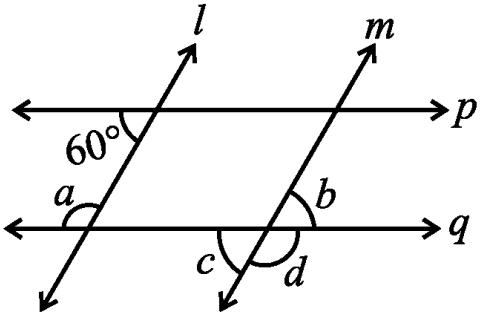
14. Lines $l \parallel m$; t is a transversal Find the value of $\angle x$.

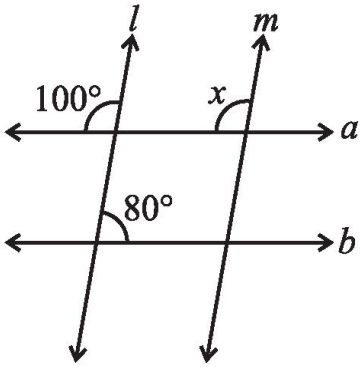




15. Lines $l \parallel m$; t is a transversal in the above right sided figure. Find the value of $\angle z$

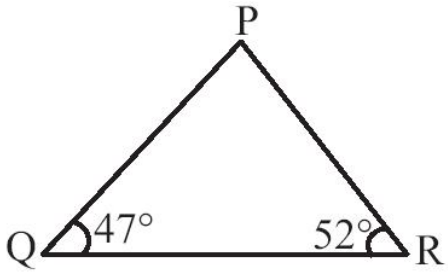
16. Lines $l \parallel m$, $p \parallel q$; Find a, b, c, d



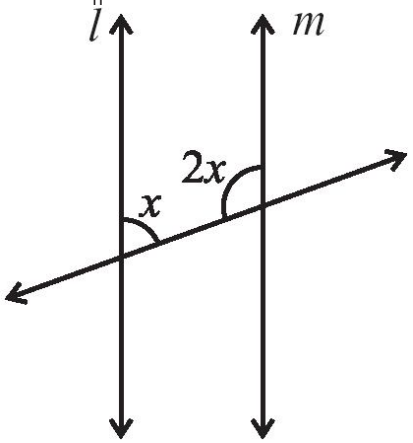


17. Find the value of x in the above right sided figure if $l \parallel m$.

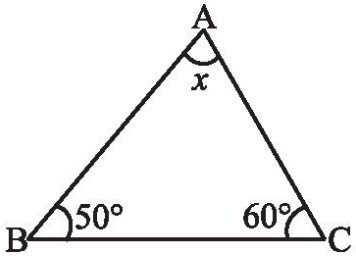
18. In the given figure, find m$\angle$P.

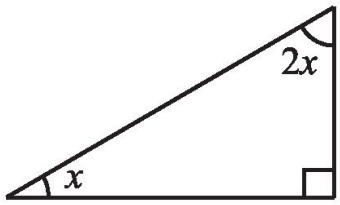


19. Find the value of x in below figure if $l \parallel m$.



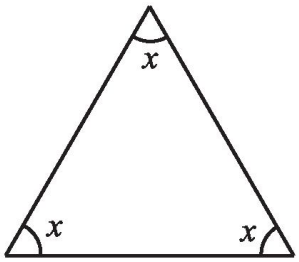
20. Find the value of the unknown x in the below figure.

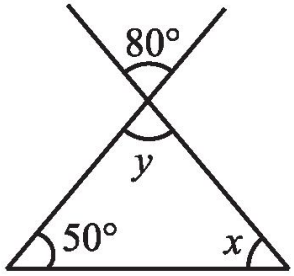




21. Find the value of the unknown x in the above right sided figure.

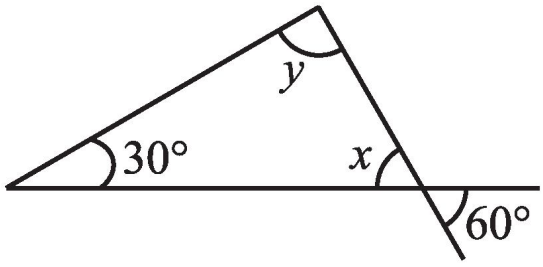
22. Find the value of the unknown x in the below figure.

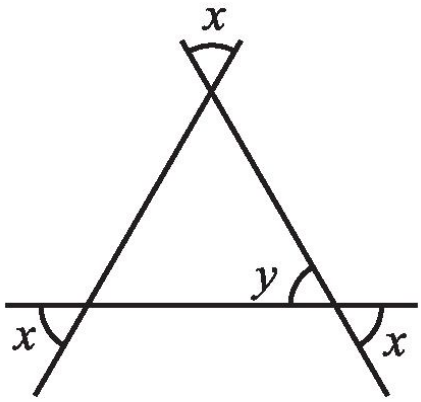




23. Find the value of x and y in the above right sided figure.

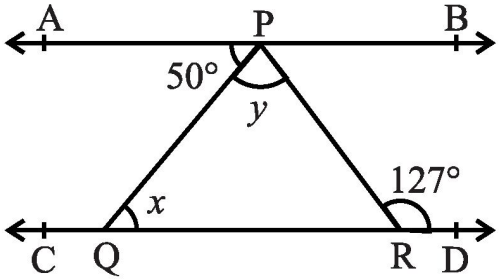
24. Find the value of x and y in the below figure.



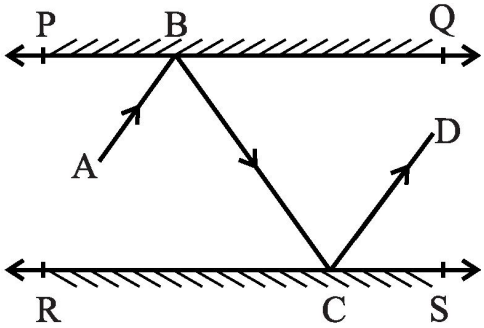


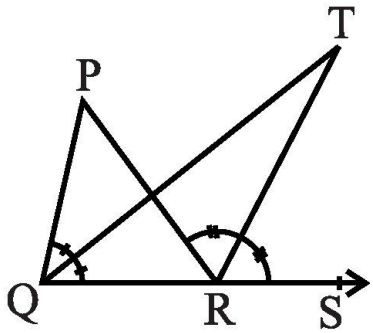
25. Find the value of x and y in the above right sided figure.

26. In the below figure, if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find *x* and *y*.



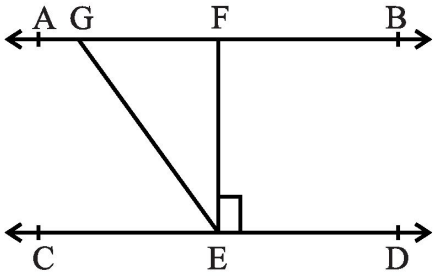
27. In the adjoining figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.



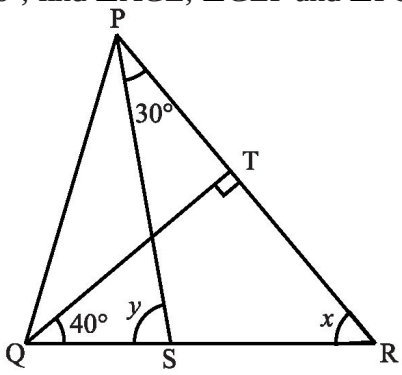


28. In the above right sided figure, the side QR of . PQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that ∠QTR = $\frac{1}{2}$∠QPR.

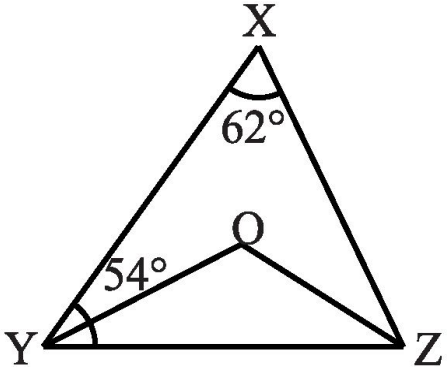
29. In below figure, if AB || CD, EF ⊥ CD and ∠GED = 126°, find ∠AGE, ∠GEF and ∠FGE.

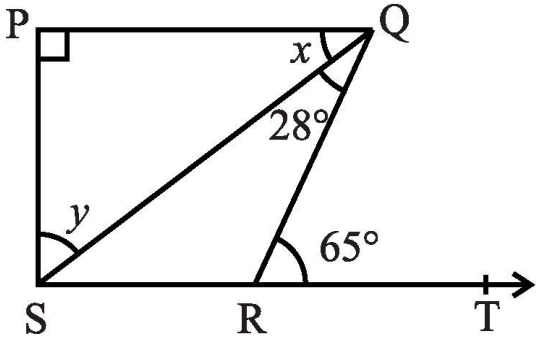


30. In the above right sided figure, if QT ⊥ PR, ∠TQR = 40° and ∠SPR = 30°, find *x* and *y*.



31. In below figure, ∠X = 62°, ∠XYZ = 54°. If YO and ZO are the bisectors of ∠XYZ and ∠XZY respectively of triangle XYZ, find ∠OZY and ∠YOZ.

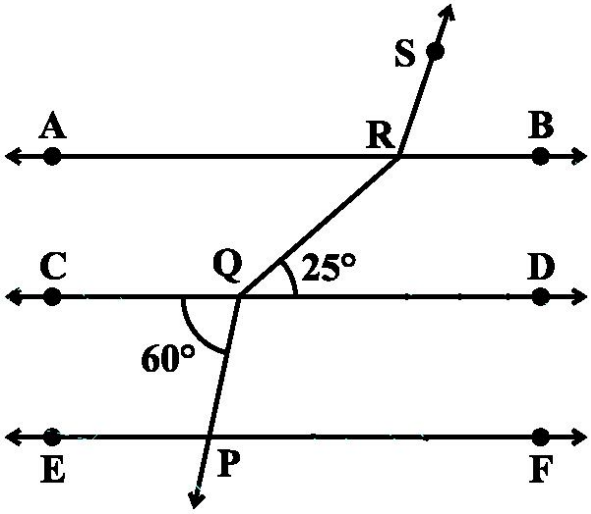


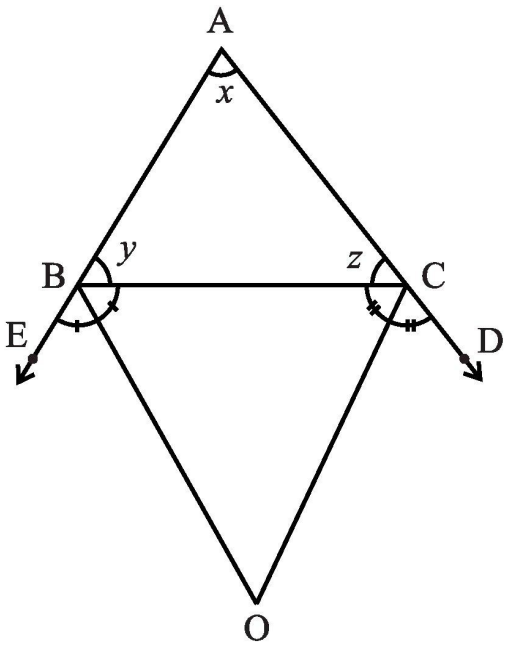


32. In the above right sided figure, if PQ ⊥ PS, PQ || SR, ∠ SQR = 28° and ∠QRT = 65°, then find the values of *x* and *y*.

33. An exterior angle of a triangle is 105° and its two interior opposite angles are equal. Find the angles

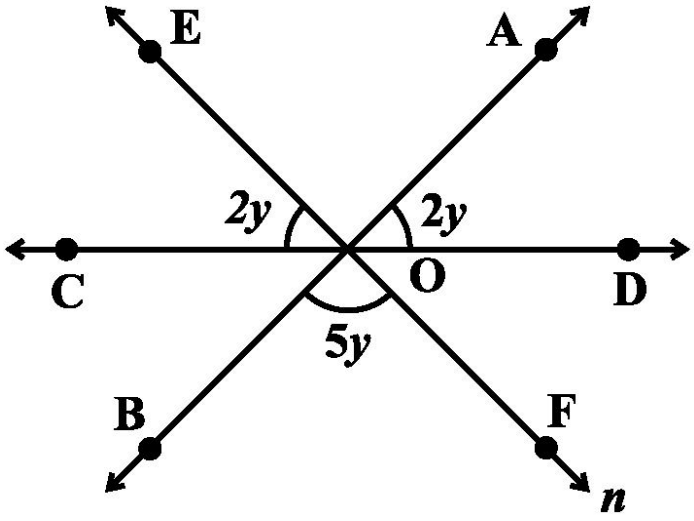
34. In the below Figure, if AB || CD || EF, PQ || RS, ∠RQD = 25° and ∠CQP = 60°, then find ∠QRS and ∠RQP

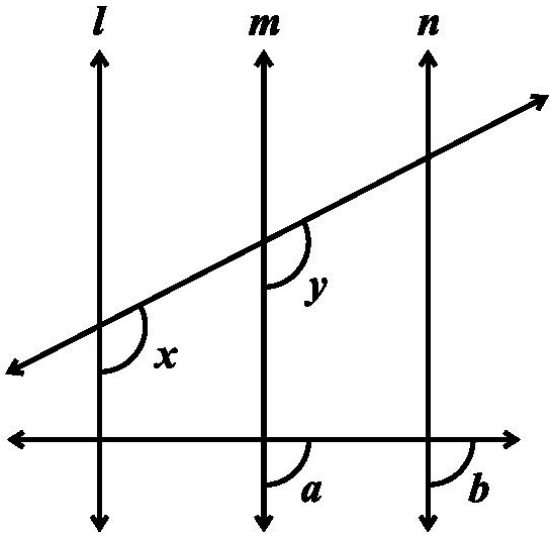




35. In the above right sided figure, the sides AB and AC of a triangle ABC are produced to points E and D respectively. If bisectors BO and CO of ∠CBE and ∠BCD respectively meet at point O, then prove that $\angle BOC = 90^0 - \frac{1}{2}\angle BAC$.

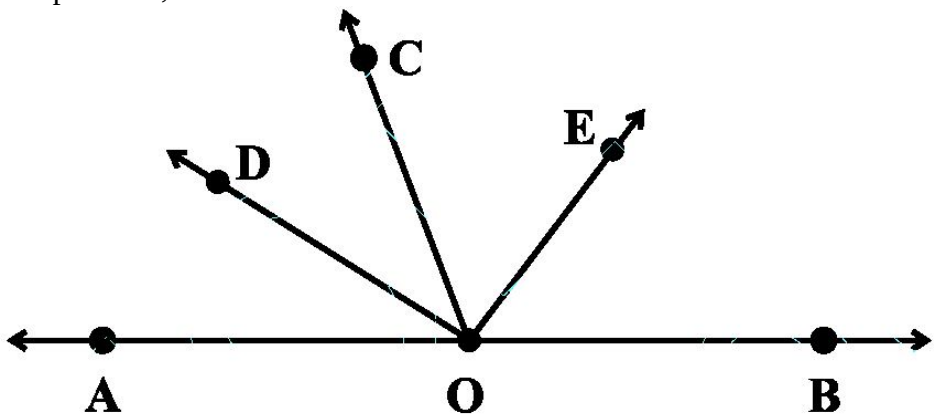
36. In the below Figure, AB, CD and EF are three lines concurrent at O. Find the value of *y*.



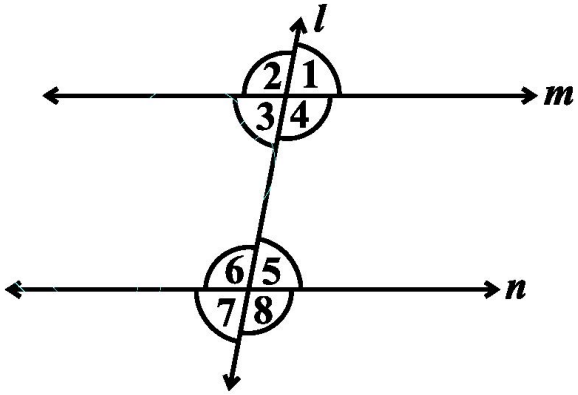


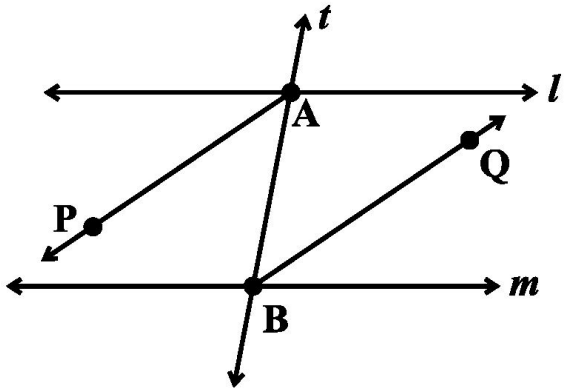
37. In the above right sided Figure, $x = y$ and $a = b$. Prove that $l \parallel n$.

38. In the below Figure, OD is the bisector of $\angle AOC$, OE is the bisector of $\angle BOC$ and OD $\perp$ OE. Show that the points A, O and B are collinear.



39. In the below Figure, $\angle 1 = 60°$ and $\angle 6 = 120°$. Show that the lines *m* and *n* are parallel.

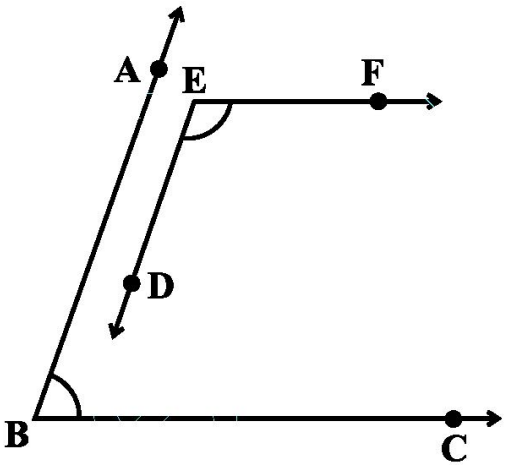


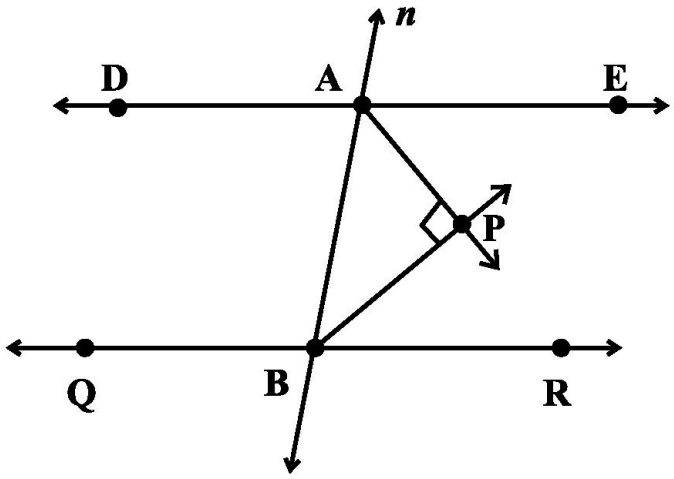


40. AP and BQ are the bisectors of the two alternate interior angles formed by the intersection of a transversal *t* with parallel lines *l* and *m* (see above right sided Figure). Show that AP || BQ.

41. If in the above right sided Figure for Q40, bisectors AP and BQ of the alternate interior angles are parallel, then show that *l* || *m*.

42. In the below Figure, BA || ED and BC || EF. Show that $\angle ABC = \angle DEF$





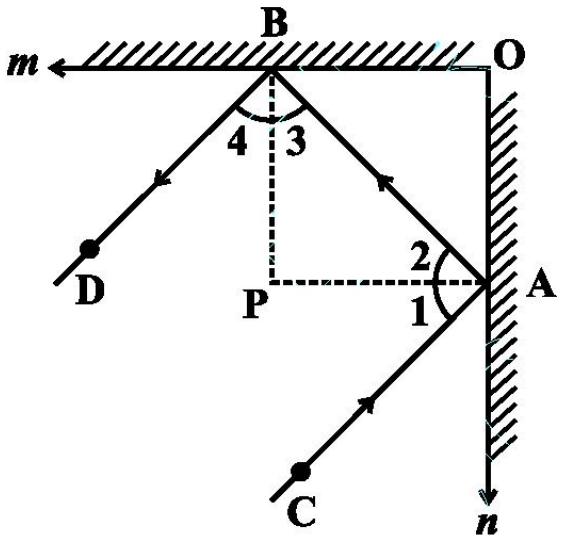
43. In the above right sided Figure, DE || QR and AP and BP are bisectors of $\angle EAB$ and $\angle RBA$, respectively. Find $\angle APB$.

44. The angles of a triangle are in the ratio 2 : 3 : 4. Find the angles of the triangle.

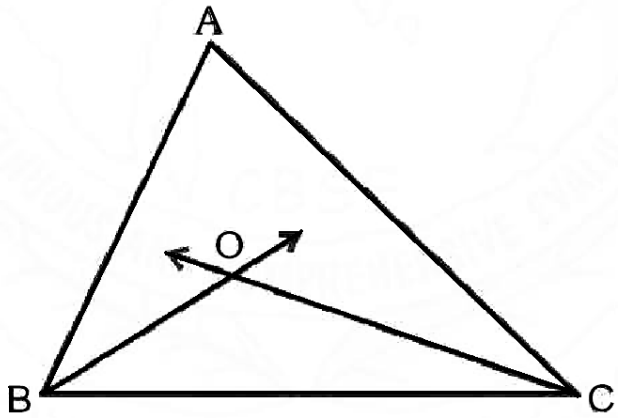
45. A triangle ABC is right angled at A. L is a point on BC such that AL ⊥ BC. Prove that ∠BAL = ∠ACB.

46. Two lines are respectively perpendicular to two parallel lines. Show that they are parallel to each other.

47. In the below Figure, *m* and *n* are two plane mirrors perpendicular to each other. Show that incident ray CA is parallel to reflected ray BD.



48. Bisectors of angles B and C of a triangle ABC intersect each other at the point O(see above right sided figure). Prove that $\angle BOC = 90° + \frac{1}{2}\angle A$.



49. Bisectors of interior ∠B and exterior ∠ACD of a ΔABC intersect at the point T. Prove that $\angle BTC = \frac{1}{2}\angle BAC$.

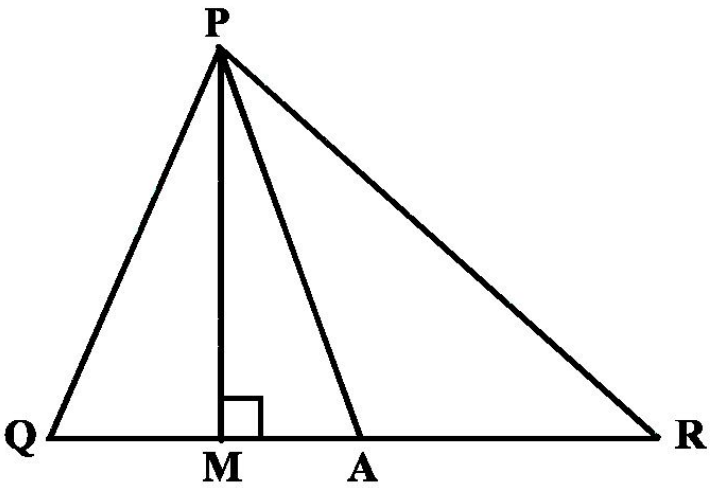
50. A transversal intersects two parallel lines. Prove that the bisectors of any pair of corresponding angles so formed are parallel.

51. Prove that through a given point, we can draw only one perpendicular to a given line.

52. Prove that two lines that are respectively perpendicular to two intersecting lines intersect each other.

53. Prove that a triangle must have at least two acute angles.

54. In the below Figure, $\angle Q > \angle R$, PA is the bisector of $\angle QPR$ and $PM \perp QR$. Prove that $\angle APM = \frac{1}{2}(\angle Q - \angle R)$.



55. If one of the angles of a triangle is 130°, then find the angle between the bisectors of the other two angles .

56. The angles of a triangle are in the ratio 5 : 3 : 7. Find the largest angle of the triangle.

57. Two adjacent angles are equal. Is it necessary that each of these angles will be a right angle? Justify your answer.

58. If one of the angles formed by two intersecting lines is a right angle, what can you say about the other three angles? Give reason for your answer.

59. Two lines *l* and *m* are perpendicular to the same line *n*. Are *l* and *m* perpendicular to each other? Give reason for your answer.

60. Angles of a triangle are in the ratio 2 : 4 : 3. find the smallest angle of the triangle.

MCQ WORKSHEET-I
CLASS IX: CHAPTER - 7
TRIANGLES

1. Line segment joining the mid point of any side with the opposite vertex is
(a) altitude (b) median c) perpendicular bisector (d) angle bisector

2. The length of perpendicular drawn from the opposite vertex to any side is
(a) altitude (b) median c) perpendicular bisector (d) angle bisector

3. The point of intersection of all the altitudes of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

4. The point of intersection of the perpendicular bisector of all sides of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

5. In a triangle, the angle opposite to the longest side is:
(a) greater than 60^0 (b) measure of 50^0
(c) greater than 90^0 (d) none of these

6. The point of intersection of all the medians of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

7. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle A$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

8. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle B$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

9. In a triangle ABC, if $2\angle A = 3\angle B = 6\angle C$, then the measure of $\angle C$ is
(a) 30^0 (b) 75^0 c) 90^0 (d) 60^0

10. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle A$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

11. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle B$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

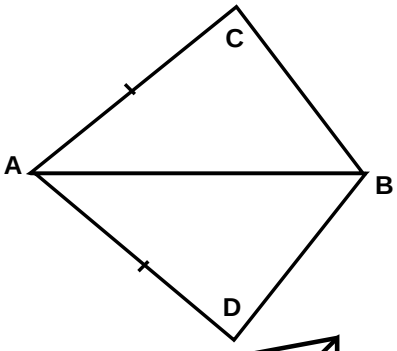
12. In a triangle ABC, if $\angle A - \angle B = 33^0$ and $\angle B - \angle C = 18^0$, then the measure of $\angle C$ is
(a) 88^0 (b) 55^0 c) 37^0 (d) 60^0

13. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle A$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

14. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle B$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

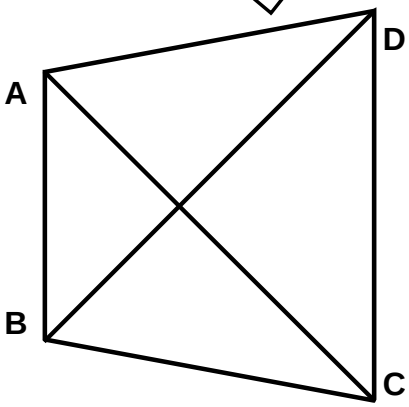
15. In a triangle ABC, if $\angle A + \angle B = 65^0$ and $\angle B + \angle C = 140^0$, then the measure of $\angle C$ is
(a) 40^0 (b) 25^0 c) 115^0 (d) 60^0

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 7
TRIANGLES



1. In quadrilateral ABCD, AC = AD and AB bisect ∠A and ΔABC ≅ ΔABD. The relation between BC and BD is

(a) BC > BD (b) BC < BD
(c) BC = BD (d) BC = (1/2)BD



2. In quadrilateral ABCD, AD = BC and ∠DAB = ∠CBA. If ΔABD ≅ ΔBAC. The relation between ∠ABD and ∠BAC is

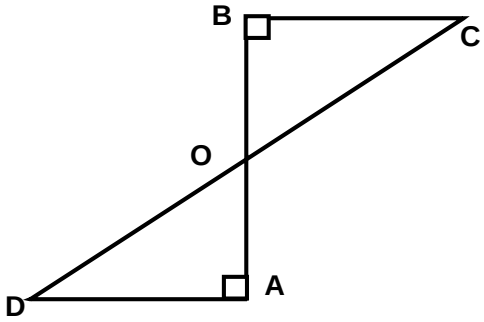
(a) ∠ABD > ∠BAC (b) ∠ABD < ∠BAC
(c) ∠ABD = ∠BAC (d) ∠ABD = (1/2)∠BAC

3. ΔABC is right triangle in which $\angle A = 90^0$ and AB = AC. The values of ∠B and ∠D will be

(a) $\angle B = \angle C = 60^0$ (b) $\angle B = \angle C = 30^0$
(c) $\angle B = \angle C = 45^0$ (d) $\angle B = \angle C = 50^0$

5. The measure of each angle of an equilateral triangle is:

(a) 60^0 (b) 30^0 c) 45^0 (d) 40^0



6. If the vertical angle of a isosceles triangle is 400 then measure of other two angles will be

(a) 60^0, 60^0 (b) 70^0 , 70^0
(c) 50^0, 50^0 (d) 75^0, 75^0

7. If ∠A, ∠B and ∠C of ΔABC are equal then triangle is:

(a) Equilateral (b) Isosceles
(c) Scalene (d) none of these.

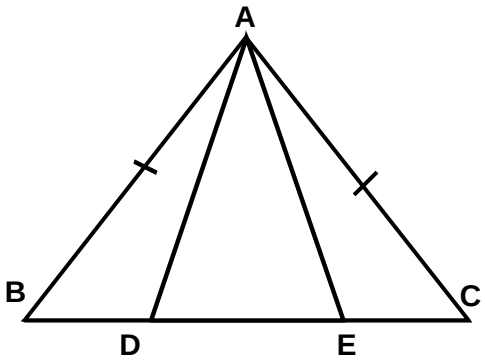
8. AC and BD are equal perpendicular to line segment AB. If ΔBOC ≅ ΔAOD, then the relation between OC and OD is

(a) OD > OC (b) OD < OC
(c) OD = OC (d) OD = (1/2)OC

9. If M is the midpoint of hypotenuse Ac of right triangle ABC then BM = $\frac{1}{2}$ ____

(a) AC (b) BC (c) AB (d) none of these

10. In fig. AB = AC and BF = CD. If ΔACD ≅ ΔABE then AD =



(a) AC (b) AE (c) AB
(d) none of these

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 7
TRIANGLES

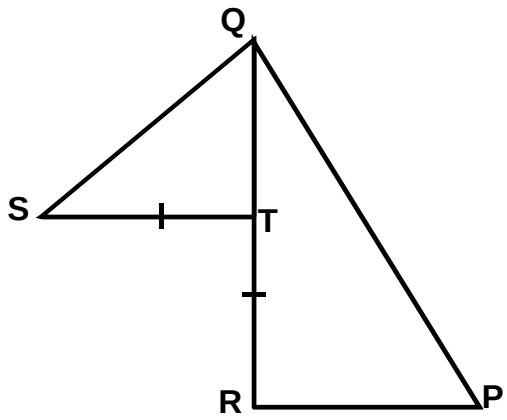
1. In a triangle, the angle opposite to the longer side is:
(a) larger (b) 90^0 (c) smaller (d) none of these

2. In a triangle side opposite to larger angle is
(a) longer (b) shorter (c) equal (d) none of these

3. In a triangle, the sum of its two sides is _____ third side.
(a) equal to (b) less than (c) greater than (d) none of these

4. The point of intersection of the angle bisector of all internal angles of a triangle is
(a) orthocentre (b) incentre c) circumcentre (d) centroid

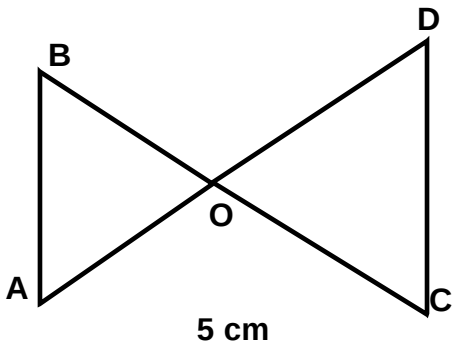
5. In fig, PQR is a triangle in which T is a point on QR and if S is a point such that RT = ST: then PQ + PR ___ QS
(a) PQ + PR > QS (b) PQ + PR < QS
(c) PQ + PR = QS (d) PQ + PR = $\frac{1}{2}$QS



6. The sum of three altitudes of triangle is _____ the sum of its three sides.
(a) equal to (b) less than
(c) greater than (d) none of these

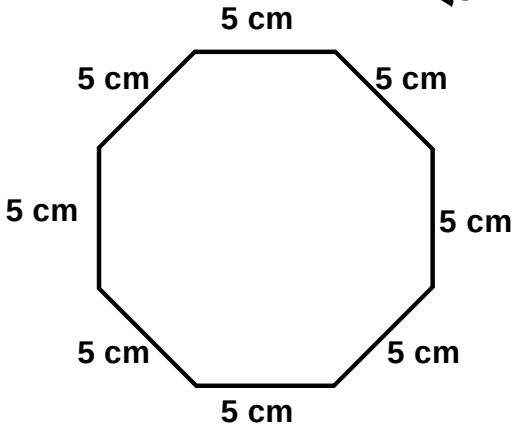
7. In a right angled triangle, _____ is the longest side.
(a) perpendicular (b) hypotenuse (c) base (d) none of these

8. In fig, $\angle B < \angle A$ and $\angle C < \angle D$ then relation between AD and BC is
(a) AD > BC (b) AD < BC
(c) AD = BC (d) none of these

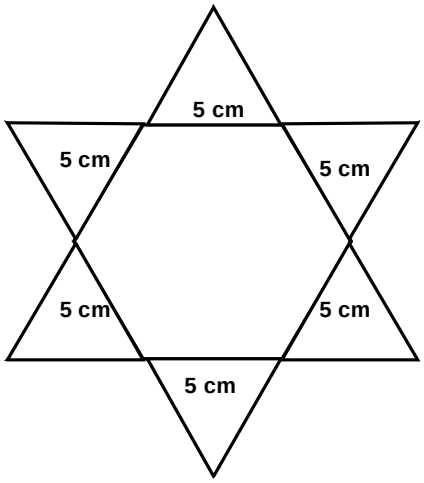


9. In a triangle ABC, $\angle A = \angle B = 62\frac{1}{2}^0$ then the longest side is
(a) AC (b) BC (c) AB (d) none of these

10. How many equilateral triangles each of 1 cm and fill the given hexagonal rangoli?
(a) 200 (b) 300 (c) 150 (d) 250



MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 7
TRIANGLES



1. How many equilateral triangles each of 1 cm and fill the given star rangoli?
(a) 200 (b) 300 (c) 150 (d) 350

2. In a triangle ABC, AC > AB and bisector of ∠A meets BC at D then ∠ADB is:
(a) acute angle (b) right angle
(c) obtuse angle (d) linear angle

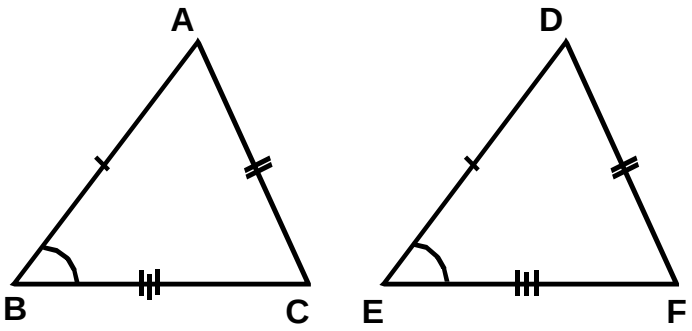
3. The difference between any two sides of a triangle is _____ the third side.
(a) equal to (b) less than (c) greater than (d) half

4. If two angles of a triangle are unequal then the side opposite side to the smaller angle is:
(a) greater (b) 90^0 (c) smaller (d) none of these

5. The sides opposite to two equal angles of a triangle are:
(a) not equal (b) congruent (c) may be congruent (d) not congruent

6. Which one of the following is the value of congruency?
(a) SAS (b) ASS (c) SSA (d) none of these

7. By which congruence rule following triangles are congruent ?
(a) SAS (b) ASS (c) AAS (d) SSS



8. In a right triangle, if acute angle is double of other angle then hypotenuse is:
(a) equal to the smallest side (b) three times the smallest side
(c) twice the smallest side (d) smaller than any of the two sides

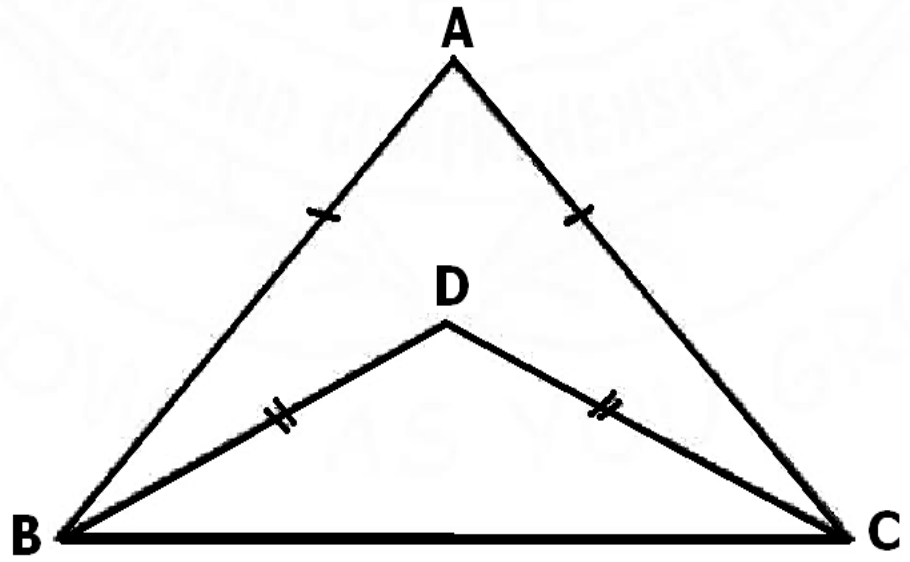
9. In a triangle ABC, if median BE = median CF then triangle is:
(a) Equilateral (b) Isosceles (c) Scalene (d) none of these.

10. The perimeter of a triangle is _____ the sum of its medians.
(a) equal to (b) less than (c) greater than (d) half of

MCQ WORKSHEET-V
CLASS IX: CHAPTER - 7
TRIANGLES

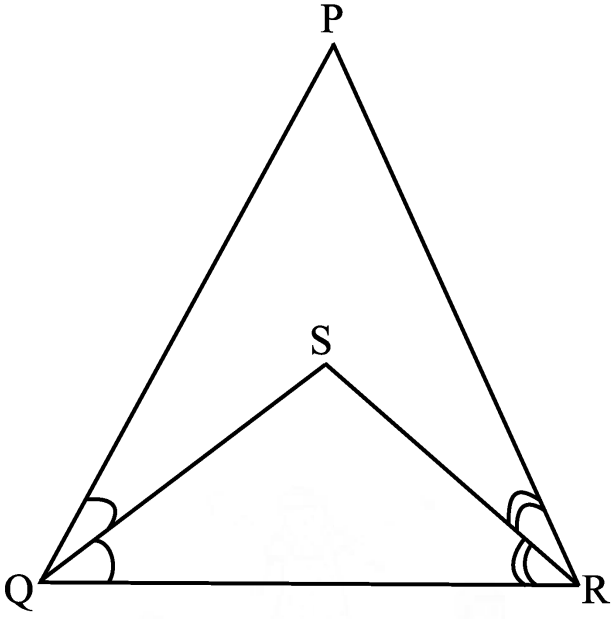
1. If one angle of a triangle is equal to the sum of other two angles, then the triangle is
(a) an Equilateral triangle (b) an Isosceles triangle
(c) an obtuse triangle (d) a right triangle .

2. In the given figure, the ratio $\angle ABD : \angle ACD$ is
(a) 1 : 1 (b) 2 : 1 (c) 1 : 2 (d) 2 : 3



3. $\angle x$ and $\angle y$ are exterior angles of a ΔABC, at the points B and C respectively. Also $\angle B > \angle C$, then relation between $\angle x$ and $\angle y$ is
(a) $\angle x > \angle y$ (b) $\angle x < \angle y$ (c) $\angle x = \angle y$ (d) none of these

4. In the given figure, PQ > PR, QS and RS are the bisectors of $\angle Q$ and $\angle R$ respectively, then
(a) SQ > SR (b) SQ < SR (c) SQ = SR (d) none of these

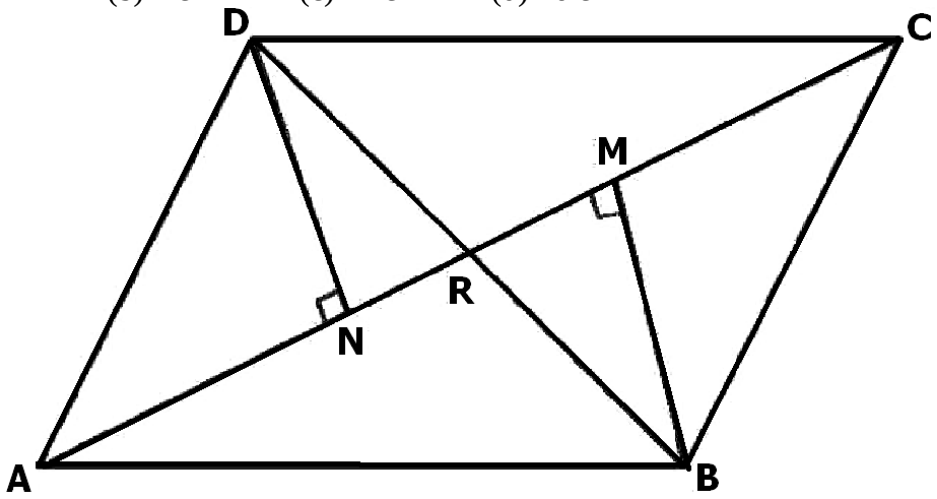


5. If the bisector of vertical angle of a triangle is perpendicular to the base of triangle is
(a) an Equilateral triangle (b) a scalene triangle
(c) an obtuse angled triangle (d) an acute angled triangle .

6. In a ΔABC and ΔPQR, three equality relations between same parts are as follows:
AB = QP, ∠B = ∠P and BC = PR
State which of the congruence conditions applies:
(a) SAS (b) ASA (c) SSS (d) RHS

7. D, E , F are the midpoints of the sides BC, CA and AB respectively of ΔABC, then ΔDEF is congruent to triangle
(a) ABC (b) AEF
(c) BFD, CDE (d) AFE, BFD, CDE

8. In quadrilateral ABCD, BM and DN are drawn perpendicular to AC such that BM = DN. If BR = 8 cm, then BD is
(a) 4 cm (b) 2 cm (c) 12 cm (d) 16 cm

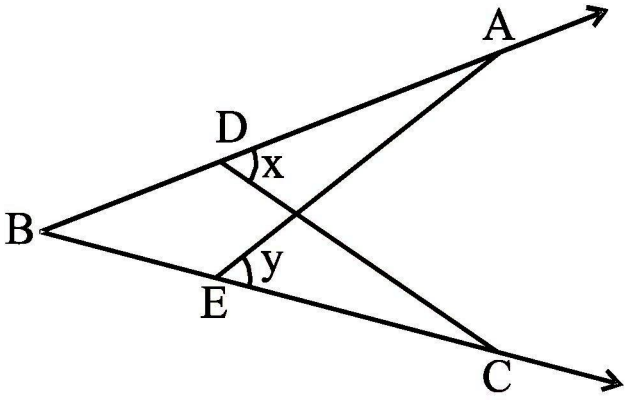


9. If ΔABC ≅ ΔPQR and ΔABC is not congruent to ΔRPQ, then which of the following is not true:
(a) BC = PQ (b) AC = PR (c) QR = BC (d) AB = PQ

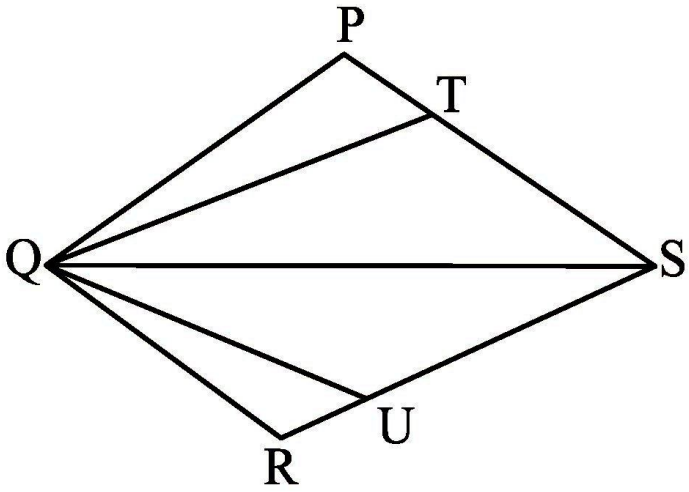
10. D is a point on the side BC of a ∠ABC such that AD bisects ΔBAC. Then
(a) BD = CD (b) BA > BD (c) BD > BA (d) CD > CA

PRACTICE QUESTIONS
CLASS IX: CHAPTER - 7
TRIANGLES

1. In the figure if $\angle x = \angle y$ and AB = CB. Prove that AE = CD.

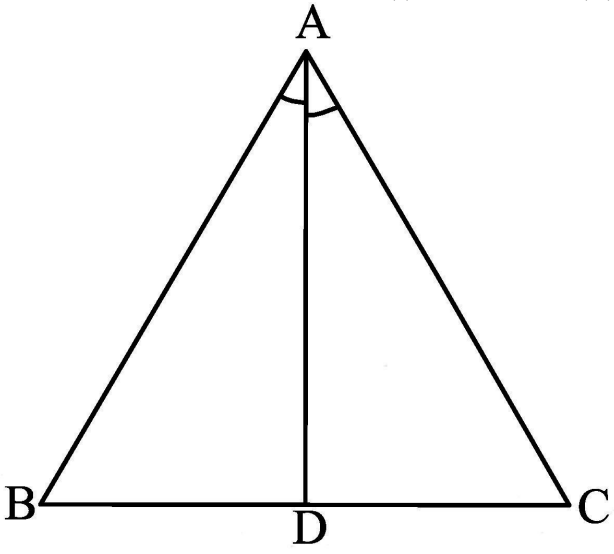


2. In the figure PQRS is a quadrilateral and T and U are respectively points on PS and RS such that PQ = RQ, $\angle PQT = \angle RQU$ and $\angle TQS = \angle UQS$. Prove that QT = QU.



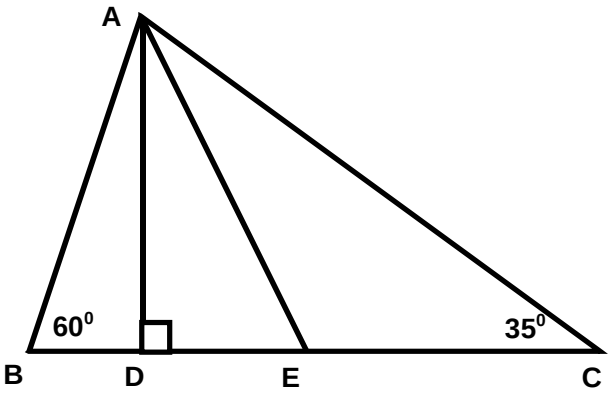
3. ABC is a triangle in which $\angle B = 2\angle C$. D is a point on BC such that AD bisects $\angle BAC$ and AB = CD. Prove that $\angle BAC = 72^0$.

4. In figure if AD is the bisector of $\angle A$, show that: (i) AB > BD (ii) AC > CD.

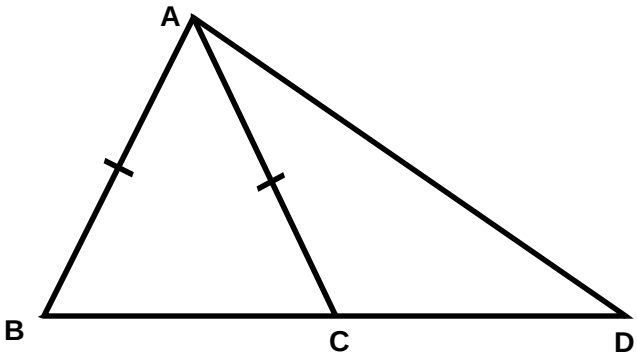


5. If two isosceles triangles have a common base, prove that the line joining the vertices bisects the base at right angle.

6. In given figure AD ⊥ BC, AE is the angle bisector of ∠BAC. Find ∠DAE



7. In given figure, ABC is a triangle in which AB = AC. If D be a point on BC produced, prove that AD > AC.



13. If two sides of a triangle are unequal, prove that the longer side has the greater angle opposite to it.

14. In a triangle, prove that the greater angle has the longer side opposite to it.

15. Prove that the sum of any two sides of a triangle is greater than its third side.

16. If in two right triangles, hypotenuse and one side of a triangle are equal to the hypotenuse and one side of other triangle, prove that the two triangles are congruent

17. Prove that "Angles opposite to equal sides of a triangle are equal".

18. Prove that "If two angles and the included side of one triangle are equal to two angles and the included side of the other triangle, then the two triangles are congruent".

19. Prove that "If two angles and one side of one triangle are equal to two angles and the corresponding side of the other triangle, then the two triangles are congruent"

20. Prove that "If three sides of one triangle are equal to three sides of the other triangle, then the two triangles are congruent".

21. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

22. Show that in a right angled triangle, the hypotenuse is the longest side.

23. Prove that the difference between any two sides of a triangle is less than its third side.

24. In an isosceles triangle, prove that the altitude from the vertex bisects the base.

25. Prove that the perpendiculars drawn from the vertices of equal angles of an isosceles triangle to the opposite sides are equal.

26. Prove that the medians of an equilateral triangle are equal.

27. If D is the midpoint of the hypotenuse AC of a right angled triangle ABC, prove that BD = $\frac{1}{2}$AC.

28. If the bisector of vertical angle of a triangle bisects the base, prove that the triangle is isosceles.

29. In a right angled triangle, one acute angle is doubled the other. Prove that the hypotenuse is double the smallest side.

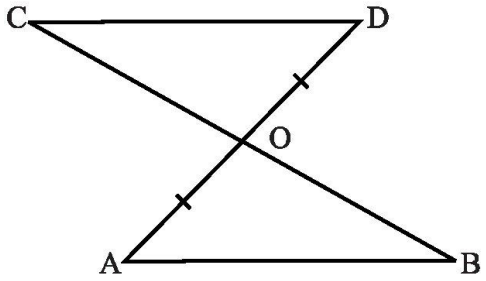
30. Show that the sum of three altitudes of a triangle is less than the sum of the three sides of the triangle.

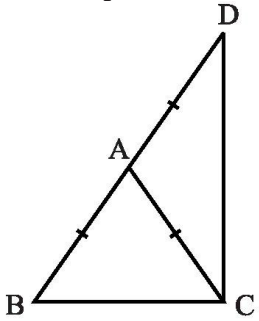
31. Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.

32. Prove that the perimeter of a triangle is greater than the sum of three medians.

33. If O is a point within ΔABC, show that
(i) AB + AC > OB + OC
(ii) AB + BC + CA > OA + OB + OC.
(iii) OA + OB + OC > $\frac{1}{2}$ (AB + BC + CA)

34. Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see the adjoining figure). Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is also the mid-point of BC.





35. ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AB (see the above right sided figure). Show that $\angle BCD$ is a right angle.

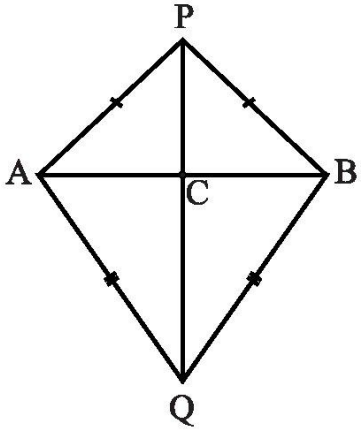
36. D is a point on side BC of ΔABC such that AD = AC. Show that AB > AD.

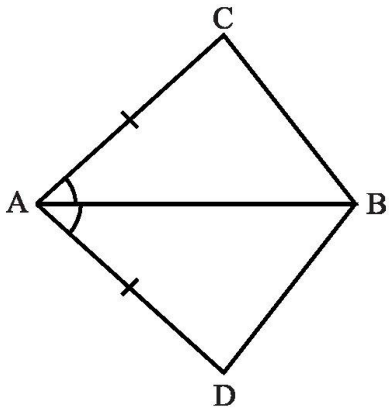
37. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that (i) AD bisects BC (ii) AD bisects ∠A.

38. AB is a line segment and line *l* is its perpendicular bisector. If a point P lies on *l*, show that P is equidistant from A and B.

39. ABC is a right angled triangle in which ∠A = 90° and AB = AC. Find ∠B and ∠C.

40. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B(see in the below left figure). Show that the line PQ is the perpendicular bisector of AB.

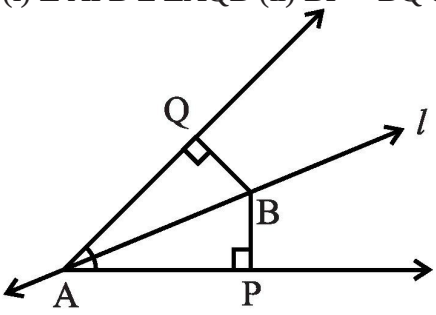


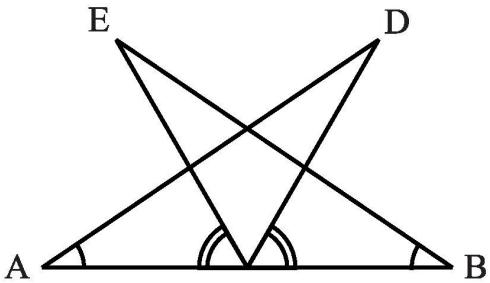


41. In quadrilateral ACBD, AC = AD and AB bisects ∠A (see the above right sided Fig.). Show that Δ ABC≅Δ ABD. What can you say about BC and BD?

42. In an isosceles triangle ABC, with AB = AC, the bisectors of ∠ B and ∠C intersect each other at O. Join A to O. Show that : (i) OB = OC (ii) AO bisects ∠A

43. Line *l* is the bisector of an angle ∠A and B is any point on *l*. BP and BQ are perpendiculars from B to the arms of ∠A (see the above side figure). Show that:
(i) Δ APB ≅ ΔAQB (ii) BP = BQ or B is equidistant from the arms of ∠A.





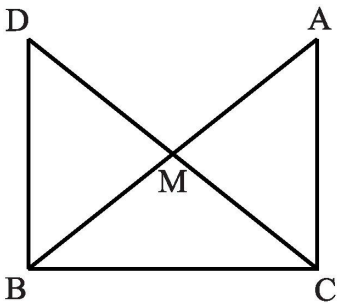
44. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB (see the above right sided figure). Show that (i) ΔDAP ≅ ΔEBP (ii) AD = BE

45. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

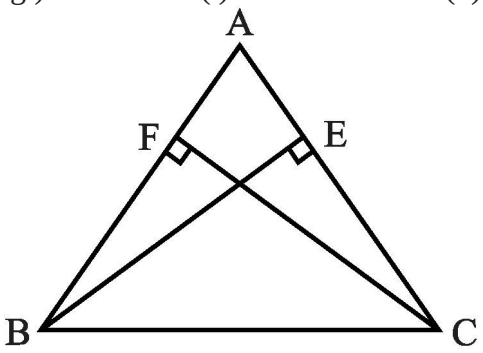
46. ABC is an isosceles triangle with AB = AC. Draw AP □⇔ BC to show that ∠B = ∠C.

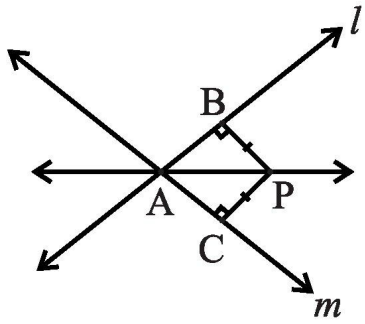
47. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B (see the above side figure). Show that:

(i) $\Delta AMC \cong \Delta BMD$ (ii) $\angle DBC$ is a right angle. (iii) $\Delta DBC \cong \Delta ACB$ (iv) $CM = \frac{1}{2} AB$



48. ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (see the below Fig.). Show that (i) $\Delta ABE \cong \Delta ACF$ (ii) AB = AC, i.e., ABC is an isosceles triangle.

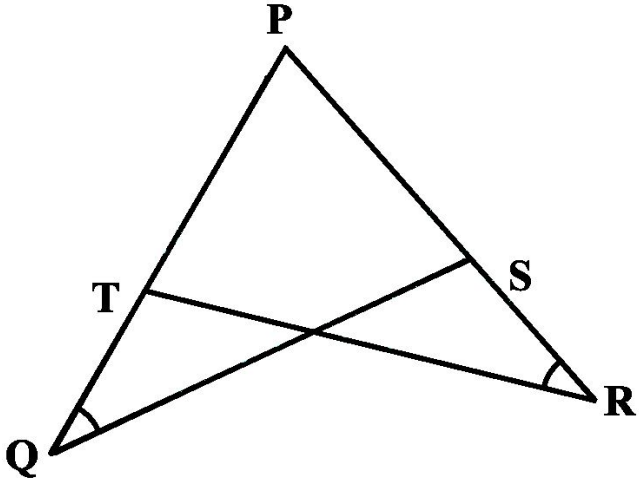


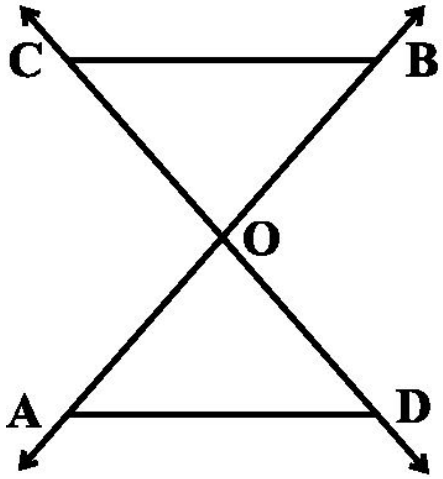


49. P is a point equidistant from two lines *l* and *m* intersecting at point A (see the above right side figure). Show that the line AP bisects the angle between them.

50. The angles of triangle are $(x + 10^0)$, $(2x - 30^0)$ and x^0. Find the value of x.

51. In the below Fig, PQ = PR and $\angle Q = \angle R$. Prove that $\Delta PQS \cong \Delta PRT$.

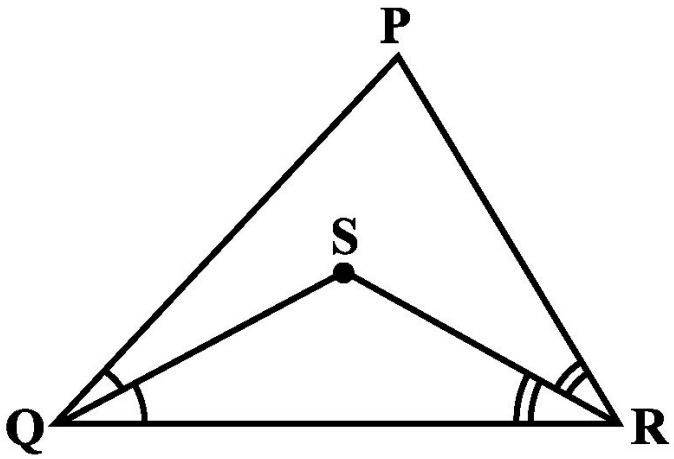




52. In the above right sided Figure, two lines AB and CD intersect each other at the point O such that BC || DA and BC = DA. Show that O is the midpoint of both the line-segments AB and CD.

53. ABC is an isosceles triangle with AB = AC and BD and CE are its two medians. Show that BD = CE.

54. In the below Figure, PQ > PR and QS and RS are the bisectors of ∠Q and ∠R, respectively. Show that SQ > SR.



55. ABCD is quadrilateral such that AB = AD and CB = CD. Prove that AC is the perpendicular bisector of BD.

56. Two lines *l* and *m* intersect at the point O and P is a point on a line *n* passing through the point O such that P is equidistant from *l* and *m*. Prove that *n* is the bisector of the angle formed by *l* and *m*.

57. Line segment joining the mid-points M and N of parallel sides AB and DC, respectively of a trapezium ABCD is perpendicular to both the sides AB and DC. Prove that AD = BC.

58. ABCD is a quadrilateral such that diagonal AC bisects the angles A and C. Prove that AB = AD and CB = CD.

59. ABC is a right triangle such that AB = AC and bisector of angle C intersects the side AB at D. Prove that AC + AD = BC.

60. P is a point on the bisector of ∠ABC. If the line through P, parallel to BA meet BC at Q, prove that BPQ is an isosceles triangle.

61. ABCD is a quadrilateral in which AB = BC and AD = CD. Show that BD bisects both the angles ABC and ADC.

62. ABC is a right triangle with AB = AC. Bisector of □∨A meets BC at D. Prove that BC = 2 AD.

63. O is a point in the interior of a square ABCD such that OAB is an equilateral triangle. Show that ΔOCD is an isosceles triangle.

64. ABC and DBC are two triangles on the same base BC such that A and D lie on the opposite sides of BC, AB = AC and DB = DC. Show that AD is the perpendicular bisector of BC.

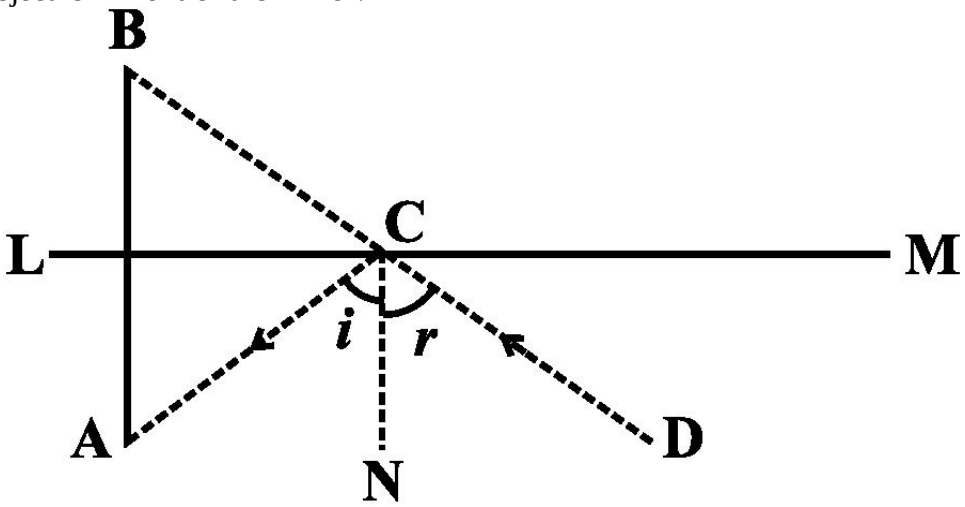
65. ABC is an isosceles triangle in which AC = BC. AD and BE are respectively two altitudes to sides BC and AC. Prove that AE = BD.

66. Prove that sum of any two sides of a triangle is greater than twice the median with respect to the third side.

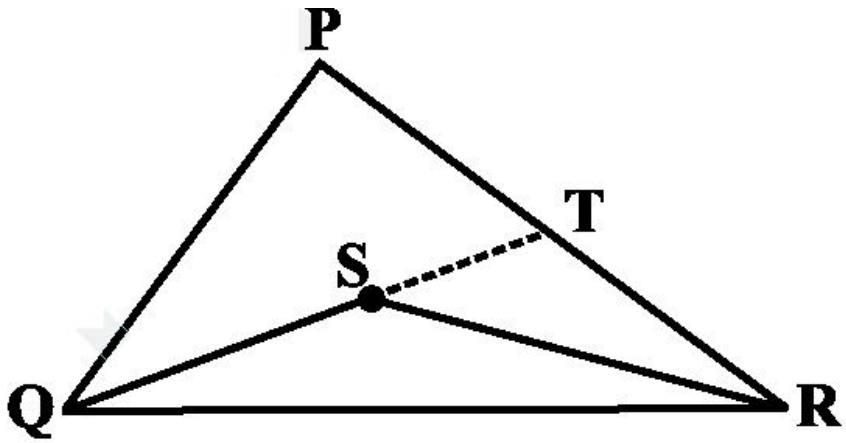
67. Show that in a quadrilateral ABCD, AB + BC + CD + DA < 2 (BD + AC).

68. In a right triangle, prove that the line-segment joining the mid-point of the hypotenuse to the opposite vertex is half the hypotenuse.

69. The image of an object placed at a point A before a plane mirror LM is seen at the point B by an observer at D as shown in below Fig.. Prove that the image is as far behind the mirror as the object is in front of the mirror.



70. S is any point in the interior of ΔPQR. Show that SQ + SR < PQ + PR.



MCQ WORKSHEET-I
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The sides of a triangular plot are in the ratio of 3 : 5 : 7 and its perimeter is 300 m. Find its area.
(a) $4\sqrt{30}$ (b) $8\sqrt{30}$ (c) $12\sqrt{30}$ (d) $16\sqrt{30}$

2. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm
(a) $1500\sqrt{3}$ (b) $3000\sqrt{3}$ (c) $4500\sqrt{3}$ (d) $6000\sqrt{3}$

3. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.
(a) $14\sqrt{11}$ (b) $21\sqrt{11}$ (c) $35\sqrt{11}$ (d) $21\sqrt{11}$

4. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.
(a) 6000 (b) 9000 (c) 12000 (d) none of these

5. The height corresponding to the longest side of the triangle whose sides are 42 cm, 34 cm and 20 cm in length is
(a) 15 cm (b) 36 cm (c) 16 cm (d) none of these

6. A park, in the shape of a quadrilateral ABCD, has $\angle C = 90^o$, AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy?
(a) 56.4 m^2 (b) 55.4 m^2 (c) 65.4 m^2 (d) none of these

7. Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm.
(a) 15 cm^2 (b) 15.4 cm^2 (c) 15.2 cm^2 (d) none of these

8. If the area of an equilateral triangle is $81\sqrt{3}$ cm^2, then its height is
(a) $9\sqrt{3}$ (b) $3\sqrt{3}$ (c) $12\sqrt{3}$ (d) none of these

9. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting?
(a) 45 m^2 (b) 48 m^2 (c) 51 m^2 (d) none of these

10. The altitude of a triangular field is one-third of its base. If the cost of sowing the field at Rs 58 per hectare is Rs. 783 then its altitude is
(a) 900 m (b) 600 m (c) 300 m (d) none of these

11. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.
(a) 12 cm (b) 15 cm (c) 18 cm (d) none of these

12. Area of equilateral triangle of side a unit is
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The height of an equilateral triangle is 6 cm, then the area of the triangle is
(a) $15\sqrt{3}$ (b) $3\sqrt{3}$ (c) $12\sqrt{3}$ (d) none of these

2. The area of an isosceles triangle each of whose equal sides is 13 m and whose base is 24 m =
(a) 45 m^2 (b) 48 m^2 (c) 60 m^2 (d) none of these

3. The base of an isosceles triangle is 24 cm and its area is 192 cm^2, then its perimeter is
(a) 64 cm (b) 65 cm (c) 68 cm (d) none of these

4. The difference between the sides at right angles in a right angled triangle is 14 cm. If the area of the triangle is 120 cm^2, then the perimeter of the triangle is
(a) 64 cm (b) 60 cm (c) 68 cm (d) none of these

5. The base of a triangular field is three times its altitudes. If the cost of sowing the field at Rs 58 per hectare is Rs. 783 then its base is
(a) 900 m (b) 600 m (c) 1200 m (d) none of these

6. The length of altitude of a equilateral triangle of side a unit is
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

7. The area of the triangle whose sides are 42 cm, 34 cm and 20 cm in length is
(a) 150 cm^2 (b) 336 cm^2 (c) 300 cm^2 (d) none of these

8. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle in cm^2 is.
(a) $9\sqrt{15}$ (b) $12\sqrt{15}$ (c) $6\sqrt{15}$ (d) none of these

9. The height corresponding to the longest side of the triangle whose sides are 91 cm, 98 cm and 105 cm in length is
(a) 76.4 cm (b) 78.4 cm (c) 65.4 cm (d) none of these

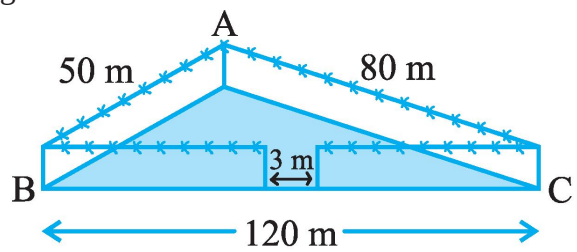
10. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then its perimeter is
(a) 64 cm (b) 60 cm (c) 36 cm (d) none of these

11. The base of a right angled triangle is 48 cm and its hypotenuse is 50 cm then its area is
(a) 150 cm^2 (b) 336 cm^2 (c) 300 cm^2 (d) none of these

12. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.
(a) 89.4 m^2 (b) 89.075 m^2 (c) 89.75 m^2 (d) none of these

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. A triangular park ABC has sides 120m, 80m and 50m . A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area in m^2 does she need to plant?



(a) $9\sqrt{15}$ (b) $12\sqrt{15}$ (c) $6\sqrt{15}$ (d) none of these

2. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude:

(a) $16\sqrt{5}$ cm (b) $10\sqrt{5}$ cm (c) $24\sqrt{5}$ cm (d) 28 cm

3. If the area of an equilateral triangle is $16\sqrt{3}\ cm^2$, then the perimeter of the triangle is:

(a) 64 cm (b) 60 cm (c) 36 cm (d) none of these

4. The length of each side of an equilateral triangle having an area of $9\sqrt{3}\ cm^2$ is:

(a) 8 cm (b) 6 cm (c) 36 cm (d) 4 cm

5. The area of an equilateral triangle with side is:

(a) 5.196 cm^2 (b) 0.866 cm^2 (c) 3.4896 cm^2 (d) 1.732 cm^2

6. The sides of a triangle are 56 cm, 60 cm and 52 cm, then the area of the triangle is:

(a) 1322 cm^2 (b) 1311 cm^2 (c) 1344 cm^2 (d) 1392 cm^2

7. The perimeter of an equilateral triangle is 60 m. The area is:

(a) $15\sqrt{3}\ m^2$ (b) $3\sqrt{3}\ m^2$ (c) $12\sqrt{3}\ m^2$ (d) none of these

8. An isosceles right triangle has area 8 cm^2, then length of its hypotenuse is

(a) $\sqrt{32}cm$ (b) $\sqrt{16}cm$ (c) $\sqrt{48}cm$ (d) $\sqrt{24}cm$

9. A traffic signal board indicating 'SCHOOL AHEAD' is an equilateral triangle with side a, then area of the traffic signal is:

(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

10. The base of a triangle is 12 cm and height is 8 cm, then the area of a triangle is:

(a) 24 cm^2 (b) 96 cm^2 (c) 48 cm^2 (d) 56 cm^2

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. The sides of a triangle are 3 cm , 4 cm and 5 cm. Its area is
(a) 12 cm^2 (b) 15 cm^2 (c) 6 cm^2 (d) 9 cm^2

2. The area of isosceles triangle whose equal sides are equal to 3 cm and other side is 4 cm. Its area is
(a) 20 cm^2 (b) $4\sqrt{5}$ cm^2 (c) $2\sqrt{5}$ cm^2 (d) 10 cm^2

3. The area of a triangular sign board of sides 5 cm , 12 cm and 13 cm is
(a) $\frac{65}{2}$ cm^2 (b) 30 cm^2 (c) 60 cm^2 (d) 12 cm^2

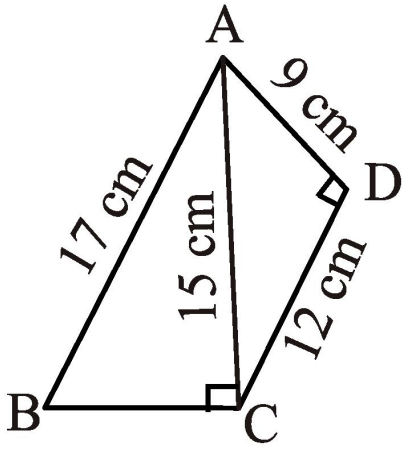
4. The side of a triangle are in the ratio of 25 : 14 : 12 and its perimeter is 510m. The greatest side of the triangle is
(a) 120 m (b) 170 m (c) 250 m (d) 270 m

5. The perimeter of a right triangle is 60 cm and its hypotenuse is 26 cm. The other two sides of the triangle are
(a) 24 cm. 10 cm (b) 25 cm. 9 cm (c) 20 cm. 14 cm (d) 26 cm. 8 cm

6. The area of quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm is
(a) 15.2 cm^2 (b) 14.8 cm^2 (c) 15 cm^2 (d) 16.4 cm^2

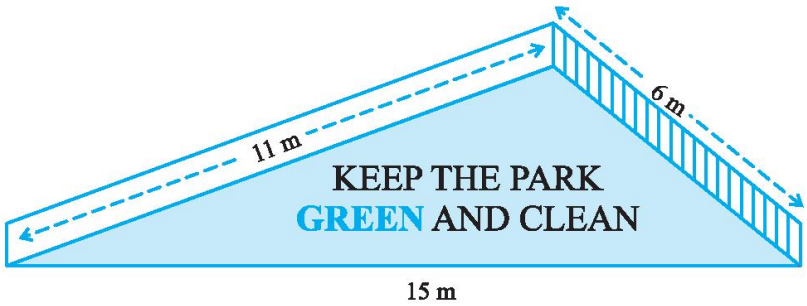
7. The area of trapezium in which the parallel sides are 28 m and 40 m, non parallel sides are 9 m and 15 m is
(a) 286 m^2 (b) 316 m^2 (c) 306 m^2 (d) 296 m^2

8. The area of quadrilateral ABCD in the below figure is
(a) 57 cm^2 (b) 95 cm^2 (c) 102 cm^2 (d) 114 cm^2



9. A traffic signal board indicating 'SCHOOL AHEAD' is an equilateral triangle with side a, then height of the traffic signal is:
(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

10. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, The area painted in colour is:



(a) $10\sqrt{2}$ m^2 (b) $20\sqrt{2}$ m^2 (c) $30\sqrt{2}$ m^2 (d) none of these

11. An isosceles right triangle has area 8 cm2. The length of its hypotenuse is

(a) $\sqrt{32}$ cm (b) $\sqrt{16}$ cm (c) $\sqrt{48}$ cm (d) $\sqrt{24}$ cm

12. The edges of a triangular board are 6 cm, 8 cm and 10 cm. The cost of painting it at the rate of 9 paise per cm2 is

(a) Rs 2.00 (b) Rs 2.16 (c) Rs 2.48 (d) Rs 3.00

13. The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm, is

(a) $\sqrt{15}$ cm^2 (b) $\sqrt{\frac{15}{2}}$ cm^2 (c) $2\sqrt{15}$ cm^2 (d) $4\sqrt{15}$ cm^2

14. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude

(a) $16\sqrt{5}$ cm (b) $10\sqrt{5}$ cm (c) $24\sqrt{5}$ cm (d) 28 cm

15. If the area of an equilateral triangle is $16\sqrt{3}$ cm2, then the perimeter of the triangle is

(a) 48 cm (b) 24 cm (c) 12 cm (d) 36 cm

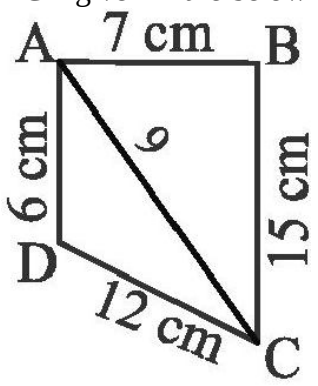
PRACTICE QUESTIONS
CLASS IX: CHAPTER - 12
HERON'S FORMULA

1. Find the area of a triangle whose sides are 35 cm, 45 cm and 50 cm.

2. An isosceles triangle has perimeter 30 cm and each of its equal sides is 12 cm. Find its area. (use $\sqrt{15} = 3.88$)

3. The measure of one side of a right triangular field is 4.2 m. If the difference of the lengths of hypotenuse and the other is 14m, find the sides of the triangle and its area.

4. Find the area of the quadrilateral ABCD given in the below figure



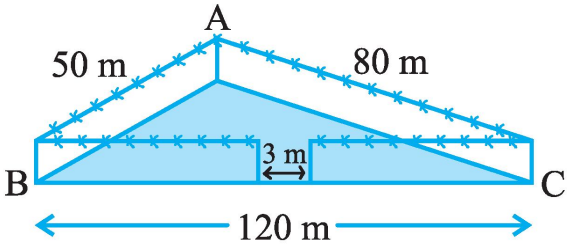
5. The perimeter of a rhombus is 40cm. If one of its diagonal is 16cm, find the area of the rhombus.

6. Two parallel sides of a trapezium are 60cm and 77cm and the other sides are 25cm and 26cm. Find the area of the trapezium.

7. Find the area of quadrilateral ABCD in which AD = 24cm, ∠BAD = 900 and B, C and D form an equilateral triangle of side 26cm. (use $\sqrt{3} = 1.73$)

8. The height of an equilateral triangle measures 9cm. Find its area, correct to two places of decimals (use $\sqrt{3} = 1.73$)

9. A triangular park ABC has sides 120m, 80m and. A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of Rs 20 per metre leaving a space 3m wide for a gate on one side.

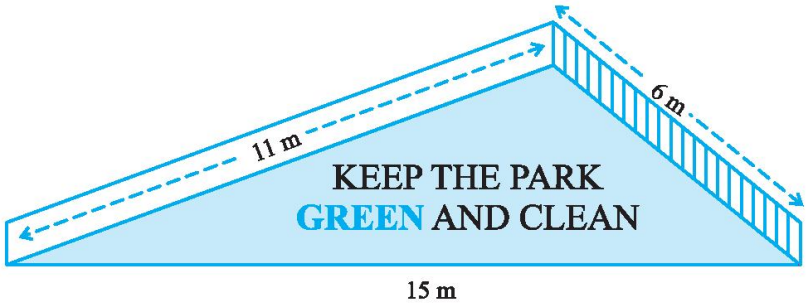


10. A traffic signal board, indicating 'SCHOOL AHEAD', is an equilateral triangle with side '*a*'. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?

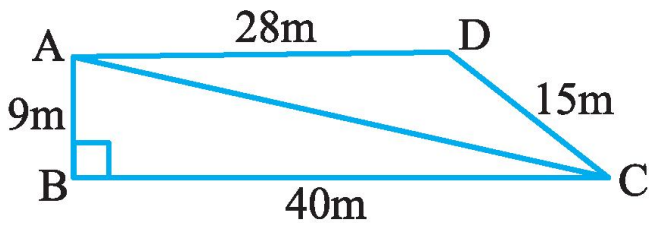
11. A park, in the shape of a quadrilateral ABCD, has ∠C = 90º, AB = 9 m, BC = 12 m, CD = 5 m and AD = 8 m. How much area does it occupy?

12. Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm.

13. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.



14. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA. Then they cleaned the area enclosed within their lanes. If AB = 9 m, BC = 40 m, CD = 15 m, DA = 28 m and $\angle B = 90^o$, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lanes).



15. Sanya has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area each of them will get for their crops?

16. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm.

17. A triangle has sides 35 cm, 54 cm and 61 cm long. Find its area. Also find smallest of its altitudes.

18. The sides of a triangular plot are in the ratio 3 : 5 : 7 and its perimeter is 300 m. Find its area.

19. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

20. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting?

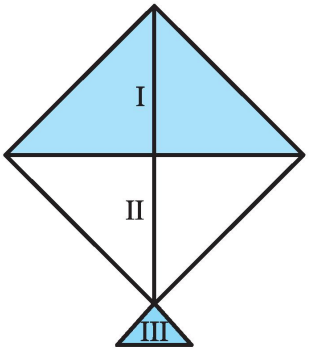
21. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.

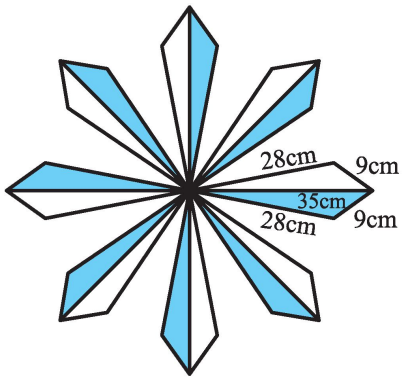
22. The base of an isosceles triangle is 10 cm and one of its equal sides is 13 cm. Find its area.

23. Find the area of a right triangle in which the sides containing the right angle measure 20 cm and 15 cm.

24. An umbrella is made by stitching 10 triangular pieces of cloth of two different colours each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?

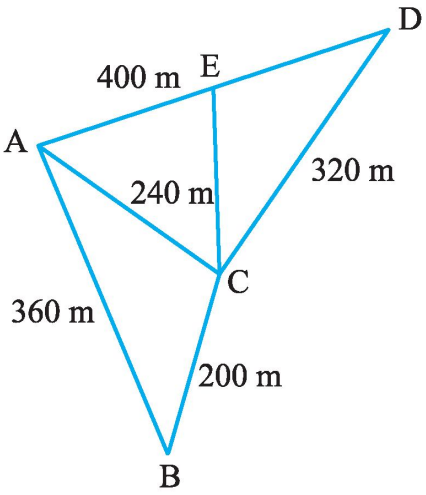
25. A kite in the shape of a square with a diagonal 32 cm and an isosceles triangle of base 8 cm and sides 6 cm each is to be made of three different shades as shown in Fig.. How much paper of each shade has been used in it?





26. A floral design on a floor is made up of 16 tiles which are triangular, the sides of the triangle being 9 cm, 28 cm and 35 cm. Find the cost of polishing the tiles at the rate of 50p per cm^2.

27. Kamla has a triangular field with sides 240 m, 200 m, 360 m, where she grew wheat. In another triangular field with sides 240 m, 320 m, 400 m adjacent to the previous field, she wanted to grow potatoes and onions. She divided the field in two parts by joining the mid-point of the longest side to the opposite vertex and grew patatoes in one part and onions in the other part. How much area (in hectares) has been used for wheat, potatoes and onions? (1 hectare = 10000 m^2).



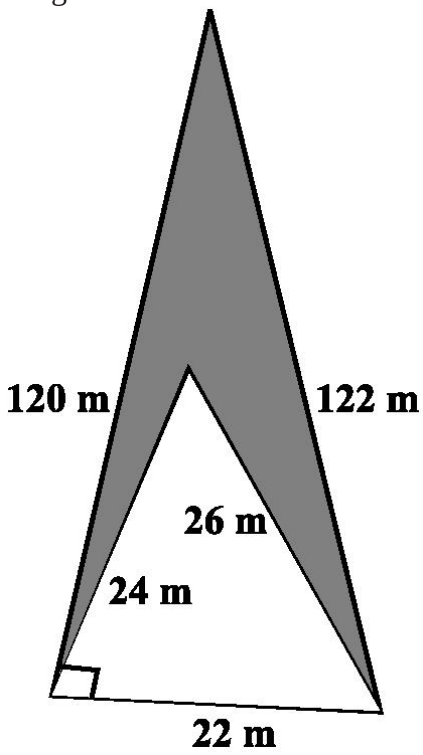
28. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.

29. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

30. Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.

31. The sides of a triangular field are 41 m, 40 m and 9 m. Find the number of rose beds that can be prepared in the field, if each rose bed, on an average needs 900 cm^2 space.

32. Calculate the area of the shaded region in



33. Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs 7 per m^2.

34. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisements yield an earning of Rs 2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?

35. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The lengths of the perpendiculars are 14 cm, 10 cm and 6 cm. Find the area of the triangle.

36. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3 : 2. Find the area of the triangle.

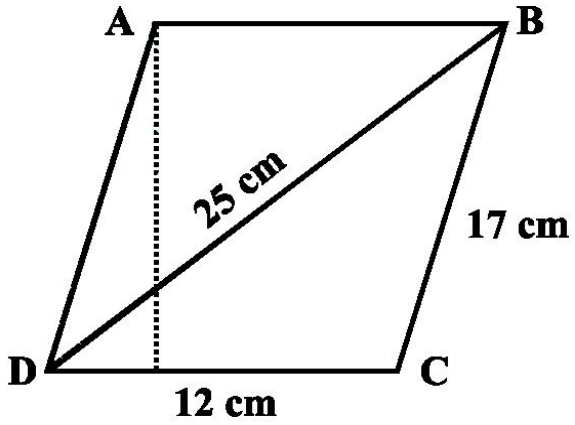
37. A field in the form of a parallelogram has sides 60 m and 40 m and one of its diagonals is 80 m long. Find the area of the parallelogram.

38. The perimeter of a triangular field is 420 m and its sides are in the ratio 6 : 7 : 8. Find the area of the triangular field.

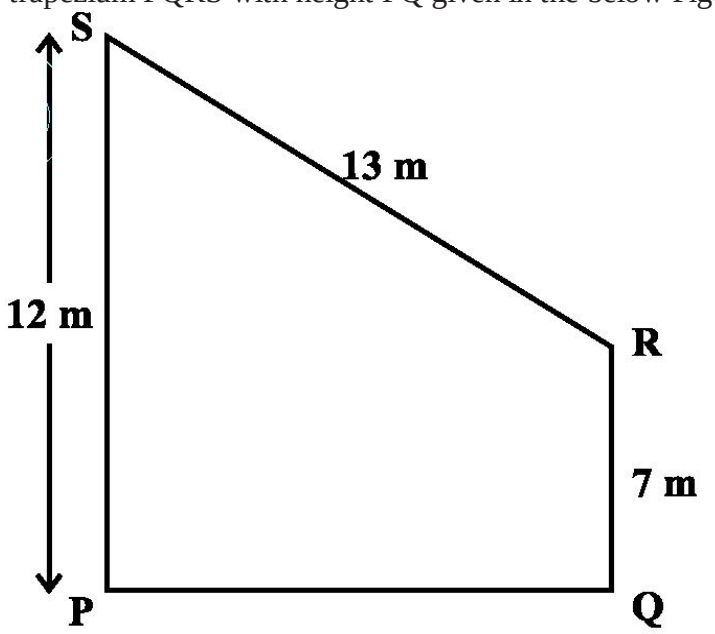
39. The sides of a quadrilateral ABCD are 6 cm, 8 cm, 12 cm and 14 cm (taken in order) respectively, and the angle between the first two sides is a right angle. Find its area.

40. A rhombus shaped sheet with perimeter 40 cm and one diagonal 12 cm, is painted on both sides at the rate of Rs 5 per m^2. Find the cost of painting.

41. Find the area of a parallelogram given in the below Figure. Also find the length of the altitude from vertex A on the side DC.



42. Find the area of the trapezium PQRS with height PQ given in the below Figure



43. If each side of a triangle is doubled, then find the ratio of area of the new triangle thus formed and the given triangle.

44. The perimeter of a triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle.

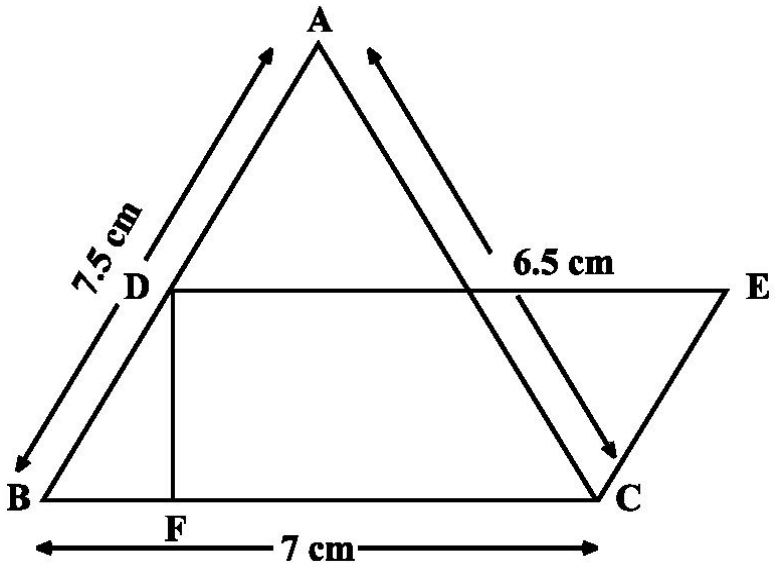
45. The area of a trapezium is 475 cm^2 and the height is 19 cm. Find the lengths of its two parallel sides if one side is 4 cm greater than the other.

46. A rectangular plot is given for constructing a house, having a measurement of 40 m long and 15 m in the front. According to the laws, a minimum of 3 m, wide space should be left in the front and back each and 2 m wide space on each of other sides. Find the largest area where house can be constructed.

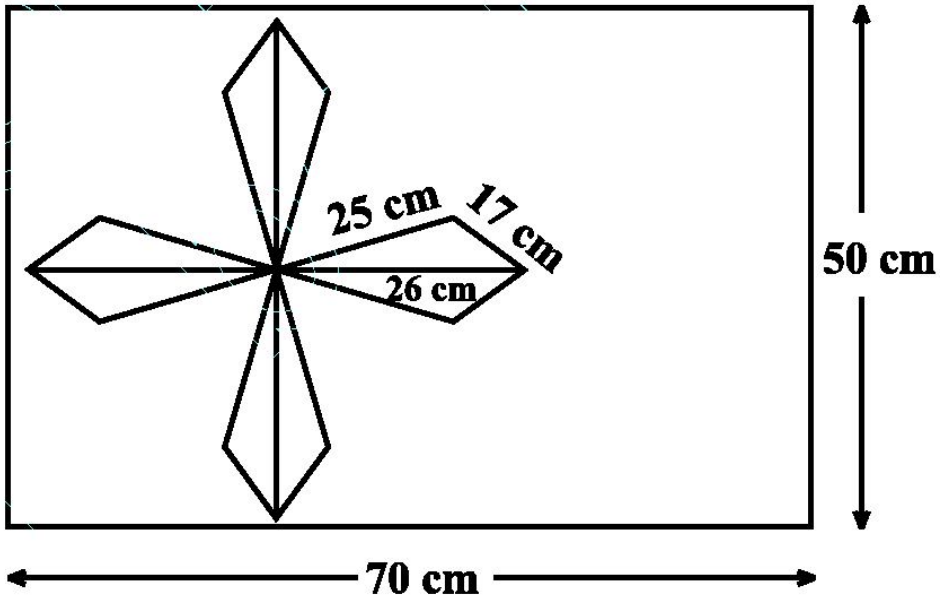
47. A field is in the shape of a trapezium having parallel sides 90 m and 30 m. These sides meet the third side at right angles. The length of the fourth side is 100 m. If it costs Rs 4 to plough $1m^2$ of the field, find the total cost of ploughing the field.

48. The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. Find the length of its longest altitude.

49. In the below Fig, ΔABC has sides AB = 7.5 cm, AC = 6.5 cm and BC = 7 cm. On base BC a parallelogram DBCE of same area as that of ΔABC is constructed. Find the height DF of the parallelogram.



50. A design is made on a rectangular tile of dimensions 50 cm × 70 cm as shown in below Figure. The design shows 8 triangles, each of sides 26 cm, 17 cm and 25 cm. Find the total area of the design and the remaining area of the tile.



BLUE PRINT : SA-I (IX) : MATHEMATICS

Unit/Topic	MCQ (1 mark)	Short answer (2 marks)	Short answer (3 marks)	Long answer (4 marks)	Total
Number System	1(1)	2(1)	6(2)	8(2)	**17(6)**
Algebra Polynomials	1(1)	6(3)	6(2)	12(3)	**25(9)**
Geometry Euclids Geom. Lines and Angles, Triangles	1(1)	2(1)	18(6)	16(4)	**37(12)**
Coordinate Geometry	--	2(1)	--	4(1)	**6(2)**
Mensuration	1(1)	--	--	4(1)	**5(2)**
Total	4(4)	12(6)	30(10)	44(11)	**90(31)**

SAMPLE PAPER – I

Class – IX **Max. Marks: 90**
Subject: Mathematics **Time Allowed: 3 hrs**

General Instruction:

(i) All questions are compulsory.
(ii) The question paper consists of 31 questions divided into four sections A, B. C and D.
(iii) Section A contains 4 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 11 questions of 4 marks each.
(iv) Use of calculator is not permitted.

SECTION – A

1. The value of $\left(\sqrt{5}+\sqrt{2}\right)\left(\sqrt{5}-\sqrt{2}\right)$ is:

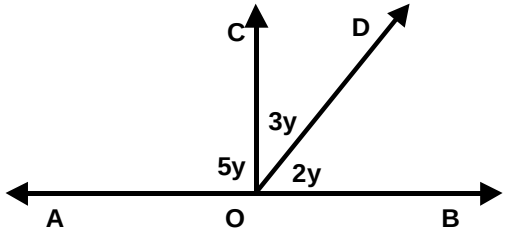
(a) 10 (b) 7 (c) 3 (d) $\sqrt{3}$

2. On dividing $x^3 + 3x^2 + 3x + 1$ by $5 + 2x$ we get remainder:

(a) $\frac{8}{27}$ (b) $\frac{27}{8}$ (c) $-\frac{27}{8}$ (d) $-\frac{8}{27}$

3. In the fig. the value of y is:

(a) 16^0 (b) 10^0 c) 15^0 (d) 18^0

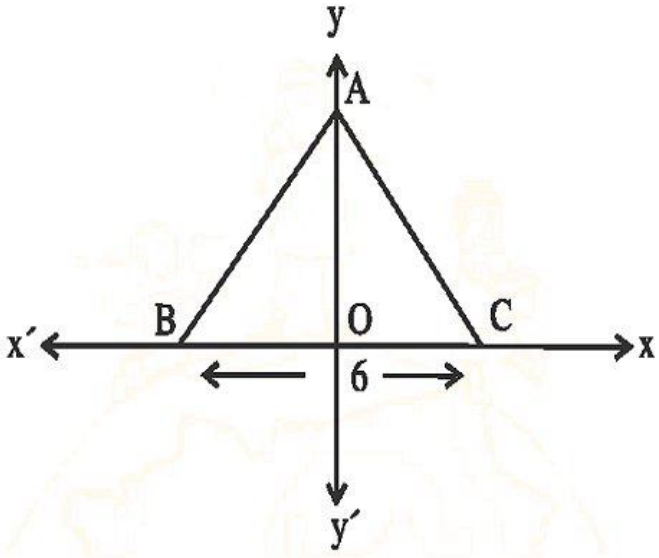


4. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then its perimeter is

(a) 64 cm (b) 60 cm (c) 36 cm (d) none of these

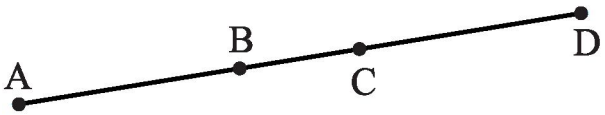
SECTION – B

5. ABC is an equilateral as shown in figure. Find the coordinates of its vertices.



6. If x = $\frac{1}{\sqrt{3}-\sqrt{2}}$, find $\sqrt{x}+\frac{1}{\sqrt{x}}$.

7. Factorize the polynomial: $8x^3 - (2x - y)^3$.



8. In adjoining figure, if AC = BD, then prove that AB = CD.

9. Find the value of *k*, if $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$.

10. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

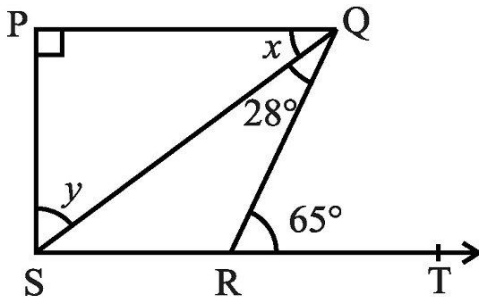
SECTION – C

11. If x = $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find $x^2+\frac{1}{x^2}$

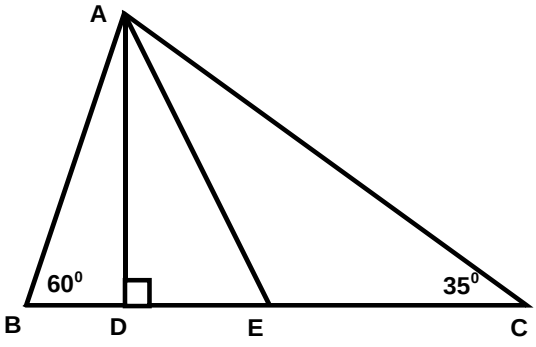
12. Find the value of a and b in $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a+b\sqrt{3}$

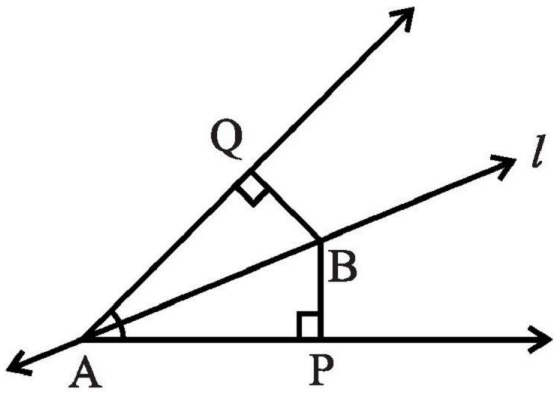
13. Factorise: $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$

14. In the below figure, if PQ ⊥ PS, PQ || SR, ∠ SQR = 28° and ∠QRT = 65°, then find the values of *x* and *y*.



15. In given figure AD ⊥ BC, AE is the angle bisector of ∠BAC. Find ∠DAE



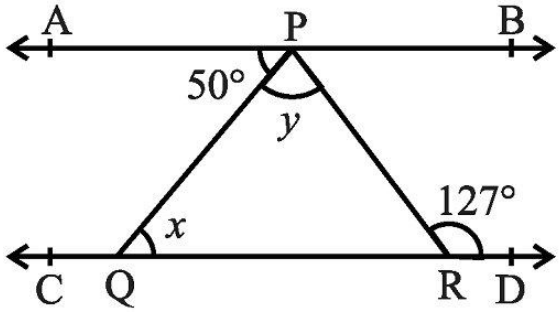


16. Line *l* is the bisector of an angle ∠A and B is any point on *l*. BP and BQ are perpendiculars from B to the arms of ∠A (see the above side figure). Show that:
(i) Δ APB ≅ ΔAQB (ii) BP = BQ or B is equidistant from the arms of ∠A.

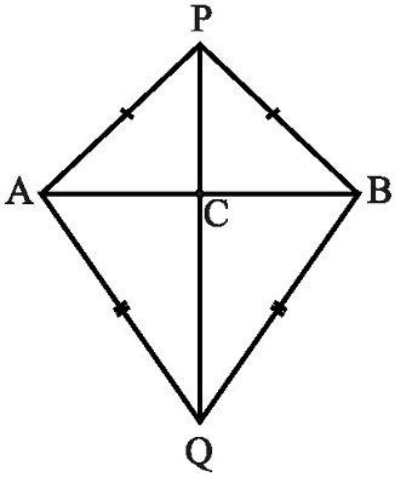
17. Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.

18. Find the integral zeroes of the polynomial $p(x) = 2x^3 + 5x^2 - 5x - 2$.

19. In the below figure, if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find *x* and *y*.

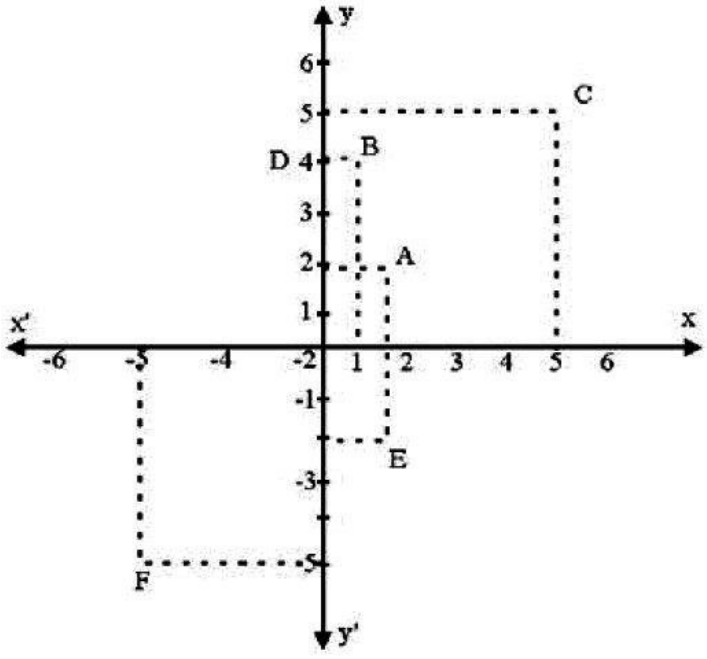


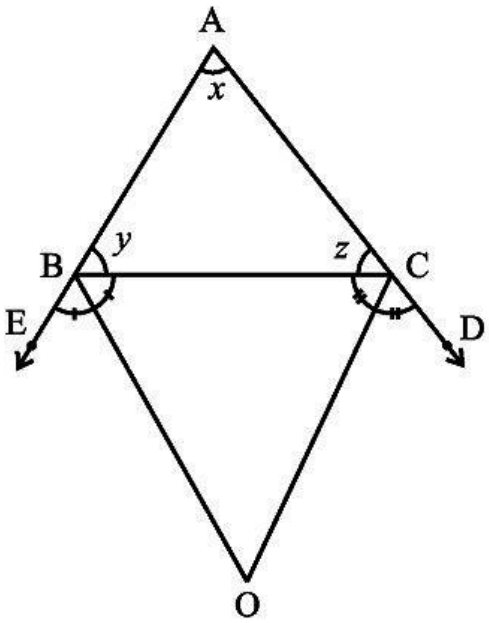
20. AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B(see in the adjoining figure). Show that the line PQ is the perpendicular bisector of AB.



SECTION – D

21. From the figure, find the coordinates of A, B, C, D, E and F. Which of the points are mirror image in (i) x – axis (ii) y – axis





22. If $x = \frac{1}{2-\sqrt{3}}$, find the value of $x^3 - 2x^2 - 7x + 5$.

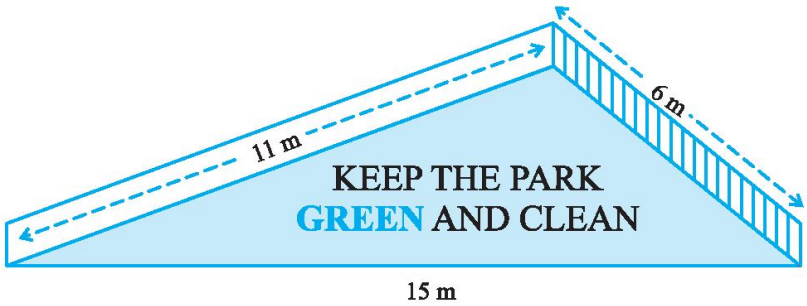
23. If polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ leaves the same remainder when each is divided by x – 4, find the value of a.

24. Factorise: $\left(\frac{1}{2}x-3y\right)^3+\left(3y-\sqrt{3}z\right)^3+\left(\sqrt{3}z-\frac{1}{2}x\right)^3$

25. Give possible expressions for the length and breadth of rectangles, in which its areas is given by $35y^2 + 13y - 12$

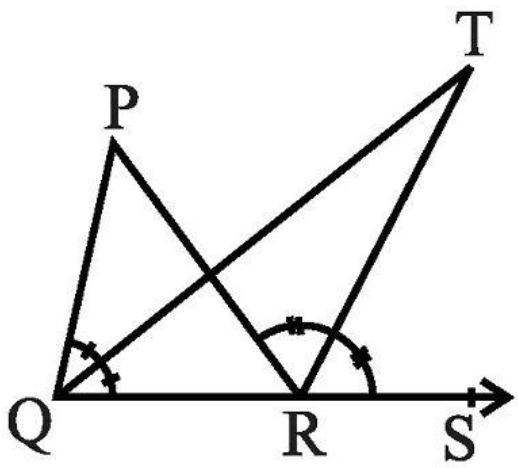
26. Find the value of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ exactly divisible by $(x - 1)$ as well as $(x - 2)$.

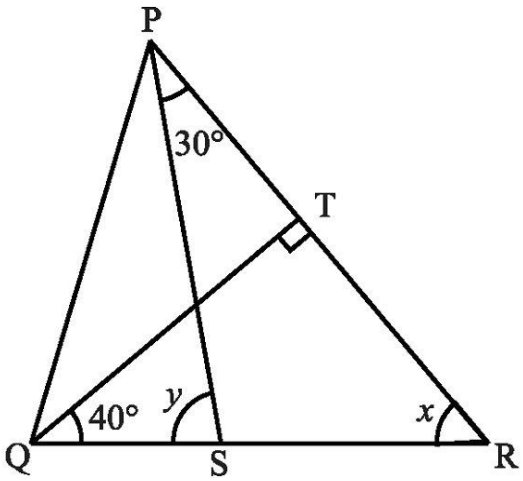
27. There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour. What values you are depicting? Write any two values.



28. In the above sided figure, the sides AB and AC of a triangle ABC are produced to points E and D respectively. If bisectors BO and CO of ∠CBE and ∠BCD respectively meet at point O, then prove that $\angle BOC = 90^0 - \frac{1}{2}\angle BAC$.

29. In the below figure, the side QR of . PQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle QPR$.





30. In the above sided figure, if QT ⊥ PR, ∠TQR = 40° and ∠SPR = 30°, find *x* and *y*.

31. If in two right triangles, hypotenuse and one side of a triangle are equal to the hypotenuse and one side of other triangle, prove that the two triangles are congruent

SAMPLE PAPER – II

Class – IX **Max. Marks: 90**
Subject: Mathematics **Time Allowed: 3 hrs**

General Instruction:

(i) All questions are compulsory.
(ii) The question paper consists of 31 questions divided into four sections A, B. C and D.
(iii) Section A contains 4 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 11 questions of 4 marks each.
(iv) Use of calculator is not permitted.

SECTION – A

1. If x – 2 is a factor of $x^3 - 3x + 5a$ then the value of a is:

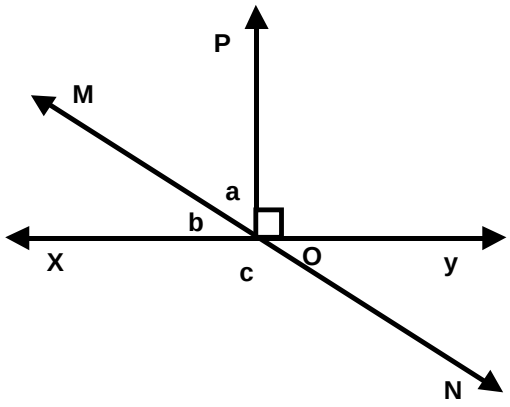
(a) 1 (b) –1 (c) $\frac{2}{5}$ (d) $\frac{-2}{5}$

2. If $x = \frac{1}{2-\sqrt{3}}$, find the value of $x^2 - 4x + 1$

(a) 3 (b) 1 (c) 0 (d) –1

3. In fig., lines XY and MN intersect each other at point O. If ∠POY = 90^0 and a : b = 2 : 3 then the value of ∠C is

(a) 140^0 (b) 120^0 c) 80^0 (d) 95^0

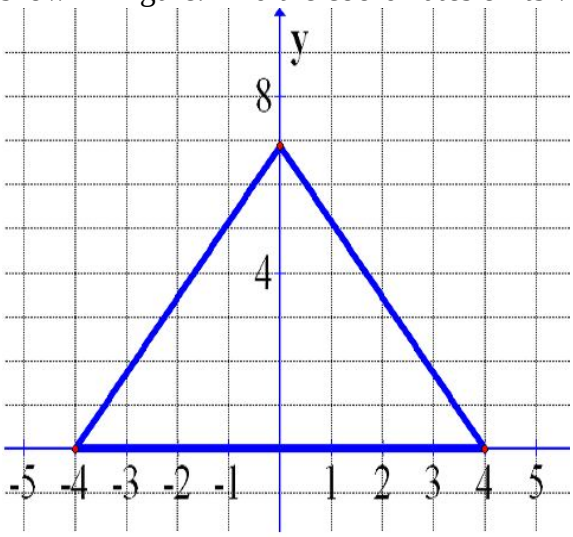


4. Area of equilateral triangle of side a unit is

(a) $\frac{\sqrt{3}}{2}a^2$ (b) $\frac{\sqrt{3}}{4}a^2$ (c) $\frac{\sqrt{3}}{2}a$ (d) none of these

SECTION – B

5. ABC is an equilateral as shown in figure. Find the coordinates of its vertices.



6. If x = $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find $x^2+\frac{1}{x^2}$

7. Factorise : $8x^3 + 27y^3 + 36x^2y + 54xy^2$

8. If x – 2 is a factor of $x^3 – 2ax^2 + ax – 1$ then find the value of a .

9. If both $x – 2$ and $x – \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.

10. If a point C lies between two points A and B such that AC = BC, then prove by using Euclid's axiom that AC = $\frac{1}{2}$ AB. Explain by drawing the figure.

SECTION – C

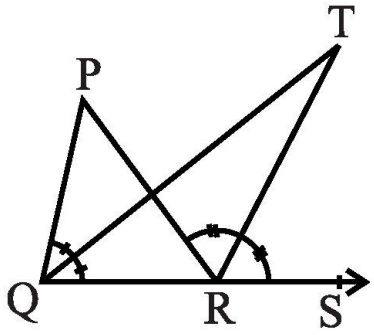
11. Show that 1.27272727……. can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

12. Find the value of a and b in $\frac{3+\sqrt{7}}{3-\sqrt{7}} = a + b\sqrt{7}$

13. Factorise: $x^3 – 2x^2 – x + 2$

14. Find the value of $x^3 + y^3 + 15xy – 125$ if x + y = 5.

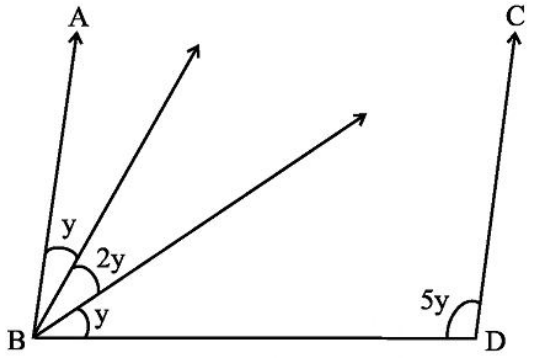
15. In the figure, the side QR of . PQR is produced to a point S. If the bisectors of ∠PQR and ∠PRS meet at point T, then prove that ∠QTR = $\frac{1}{2}$ ∠QPR..



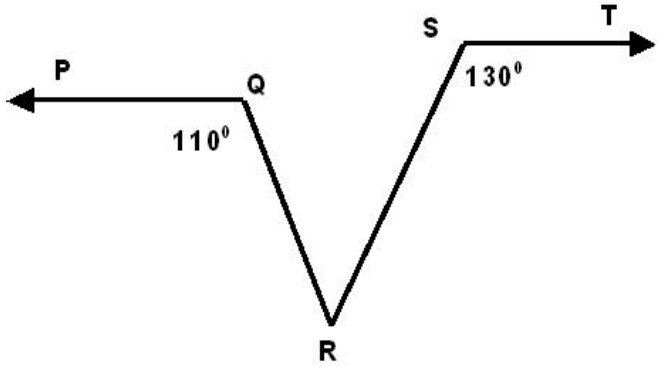
16. ABC is triangle in which ∠B = 2∠C. D is a point on BC such that AD bisects ∠BAC and AB = CD. Prove that ∠BAC = 72^0.

17. If two sides of a triangle are unequal, prove that the longer side has the greater angle opposite to it.

18. In the figure, if AB || CD then what is the value of y.



19. In the fig, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$ then find the value of $\angle QRS$.

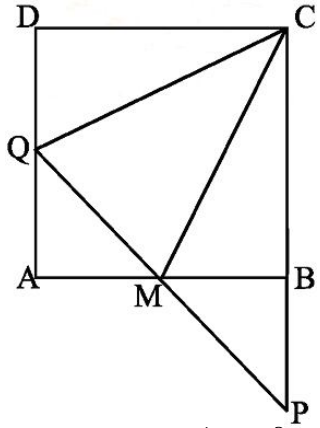


20. In a right angle triangle, one acute angle is double the other. Prove that hypotenuse is double the smallest side.

SECTION – D

21. If $x = \frac{1}{3-\sqrt{8}}$, find the value of $x^3 - 2x^2 - 7x + 5$.

22. In fig. ABCD is a square. M is the midpoint of AB and PQ ⊥ CM. Prove that CP = CQ.

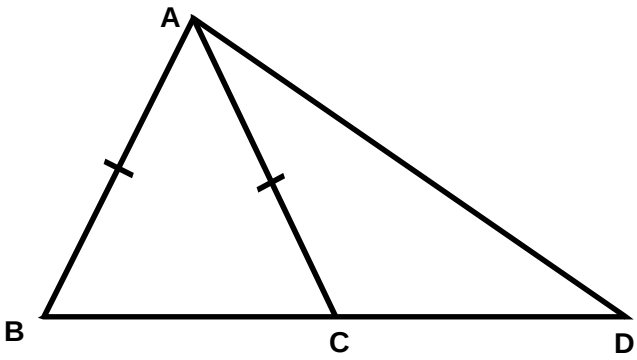


23. Find the value of a and b so that the polynomial $(x^4 + ax^3 - 7x^2 + 8x + b)$ is exactly divisible by (x + 2) as well as (x + 3).

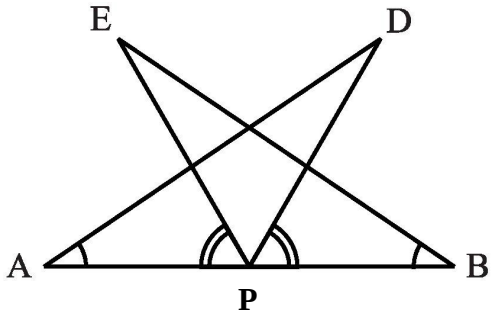
24. Factorise: $\left(\sqrt{5}x - 3\sqrt{2}y\right)^3 + \left(3\sqrt{2}y - \frac{4}{3}z\right)^3 + \left(\frac{4}{3}z - \sqrt{5}x\right)^3$

25. Prove that "If three sides of one triangle are equal to three sides of the other triangle, then the two triangles are congruent".

26. In given figure, ABC is a triangle in which AB = AC. If D be a point on BC produced, prove that AD > AC.



27. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that ∠BAD = ∠ABE and ∠EPA = ∠DPB (see the below figure). Show that (i) ΔDAP ≅ ΔEBP (ii) AD = BE



28. Without actually calculating the cubes, find the value of $(28)^3 + (-15)^3 + (-13)^3$

29. The polynomial $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by (x – 1) and (x + 1) leaves the remainders 5 and 9 respectively. Find the values of a and b.

30. Plot the points A (4, 4) and (–4, 4) on a graph sheet. Join the lines OA, OB and BA. What figure do you obtain?

31. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA. Then they cleaned the area enclosed within their lanes. If AB = 9 m, BC = 40 m, CD = 15 m, DA = 28 m and ∠B = 90º, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lanes). What values you are depicting? Write any two values.