

First Term Exam (2021-22)

Class 10 - Mathematics Sample Paper 01

Maximum Marks: 40

Time Allowed: 90 minutes

General Instructions:

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Attempt any 16 questions.
3. Section B consists of 20 questions of 1 mark each. Attempt any 16 questions.
4. Section C consists of 10 questions based on two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

Section A

1. The least positive integer divisible by 20 and 24 is
 - a. 480
 - b. 240
 - c. 360
 - d. 120
2. One equation of a pair of dependent linear equations is $-5x + 7y = 2$, then the second equation can be
 - a. $-10x + 14y + 4 = 0$
 - b. $-10x - 14y + 4 = 0$
 - c. $10x - 14y + 4 = 0$
 - d. $10x + 14y + 4 = 0$
3. The zeros of the quadratic polynomial $x^2 + 88x + 125$ are
 - a. both negative
 - b. both positive
 - c. both equal
 - d. one positive and one negative
4. The pair of equations $5x - 15y = 8$ and $3x - 9y = \frac{24}{5}$ has
 - a. infinitely many solutions
 - b. no solution
 - c. two solutions
 - d. one solution
5. If $\sin \theta = \frac{1}{2}$ and $\cos \phi = \frac{1}{2}$, then the value of $(\theta + \phi)$ is
 - a. 60°
 - b. 30°
 - c. 120°
 - d. 90°
6. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3 b$; a, b being prime numbers, then LCM (p, q) is

- a. $a^3 b^3$
- b. $a^3 b^2$
- c. $a^2 b^2$
- d. ab

7. A quadratic polynomial, the sum of whose zeroes is 0 and one zero is 3, is

- a. $x^2 - 9$
- b. $x^2 + 3$
- c. $x^2 - 3$
- d. $x^2 + 9$

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8. The distance between the points $(\sin\theta, \cos\theta)$ and $(\cos\theta, -\sin\theta)$ is

- a. $\sqrt{2}$ units
- b. 2 units
- c. $2\sqrt{2}$ units
- d. $\sqrt{\sin\theta + \cos\theta}$ units

9. If α and β are the zeros of the polynomial $f(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is its zero is

- a. $qx^2 + px + 1$
- b. $x^2 + qx + p$
- c. $x^2 - px + q$
- d. $px^2 + qx + 1$

10. The zeroes of the quadratic polynomial $x^2 + 9x + 20$ are

- a. -4 and 5
- b. -4 and -5
- c. 4 and 5
- d. 4 and -5

11. The probability that it will rain on a particular day is 0.76. The probability that it will not rain on that day is

- a. 0.24
- b. 0.76
- c. 0
- d. 1

12. $\sqrt{2}$ is

- a. a non-terminating repeating decimal
- b. a rational number
- c. a terminating decimal
- d. an irrational number

13. A circle has its centre at the origin and a point $P(5, 0)$ lies on it. Then the point $Q(8, 6)$ lies _____ the circle.

- a. in side
- b. out side
- c. on
- d. None of these

14. If the centroid of the triangle formed by the points (a, b) , (b, c) and (c, a) is at the origin, then $a^3 + b^3 + c^3 =$
- $2a$
 - 0
 - $3abc$
 - $a + b + c$
15. On dividing the polynomial $x^4 - 5x + 6$ by $2 - x^2$, the remainder is
- $-5x - 10$
 - $5x - 10$
 - $-5x + 10$
 - $5x + 10$
16. $\frac{\sin \theta}{1 - \cot \theta} + \frac{\cos \theta}{1 - \tan \theta}$ is equal to
- $\sin \theta + \cos \theta$
 - $\sin \theta - \cos \theta$
 - 0
 - 1
17. The sum of the digits of a two digit number is 9. Nine times this number is twice the number obtained by reversing the digits, then the number is
- 72
 - 27
 - 18
 - 81
18. Three coins are tossed simultaneously. What is the probability of getting exactly two heads?
- $\frac{1}{4}$
 - $\frac{1}{2}$
 - $\frac{3}{8}$
 - $\frac{3}{4}$
19. If $m^2 - 1$ is divisible by 8, then m is
- an odd integer
 - a natural number
 - an even integer
 - a whole number
20. Three consecutive vertices of a parallelogram ABCD are $A(1, 2)$, $B(1, 0)$ and $C(4, 0)$. The co-ordinates of the fourth vertex D are
- $(-4, 2)$
 - $(4, -2)$
 - $(4, 2)$
 - $(-4, -2)$

Section B

21. The area of the triangle formed by the lines $2x + y = 6$, $2x - y + 2 = 0$ and the x -axis is
- 12 sq. units
 - 15 sq. units
 - 10 sq. units
 - 8 sq. units
22. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are

- a. both negative
b. one positive and one negative
c. both positive
d. both equal
23. $(2 + \sqrt{2})$ is
a. none of these
b. an integer
c. a rational number
d. an irrational number
24. The value of $\tan 15^\circ \tan 20^\circ \tan 70^\circ \tan 75^\circ$ is
a. 2
b. 0
c. 1
d. -1
25. If $x - y = 2$ and $\frac{2}{x+y} = \frac{1}{5}$ then
a. $x = 6, y = 4$
b. $x = 7, y = 5$
c. $x = 5, y = 3$
d. $x = 4, y = 2$
26. If α, β, γ are the zeros of the polynomial $f(x) = ax^3 + bx^2 + cx + d$, then $\alpha^2 + \beta^2 + \gamma^2 =$
a. $\frac{b^2 - ac}{a^2}$
b. $\frac{b^2 - 2ac}{a}$
c. $\frac{b^2 + 2ac}{b^2}$
d. $\frac{b^2 - 2ac}{a^2}$
27. In a $\triangle ABC$, $\angle A = 90^\circ$, $AB = 5$ cm and $AC = 12$ cm. Also $AD \perp BC$, Then $AD =$
a. $\frac{2\sqrt{15}}{13}$ cm
b. $\frac{60}{13}$ cm
c. $\frac{13}{40}$ cm
d. $\frac{13}{2}$ cm
28. If the coordinates of a point are $(-5, 11)$, then its abscissa is
a. -5
b. 11
c. 5
d. -11
29. If $\sec\theta + \tan\theta = x$, then $\tan\theta =$
a. $\frac{x^2 + 1}{x}$
b. $\frac{x^2 + 1}{2x}$
c. $\frac{x^2 - 1}{x}$
d. $\frac{x^2 - 1}{2x}$
30. The area of the triangle formed by the lines $2x + 3y = 12$, $x - y = 1$ and $x = 0$ is
a. 6.5 sq. units

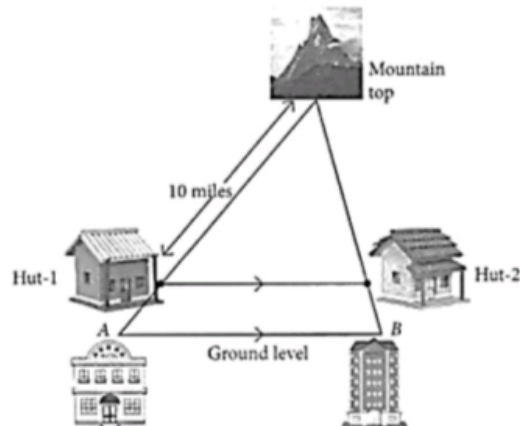
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- b. 7 sq. units
c. 7.5 sq. units
d. 6 sq. units
31. $3 + 2\sqrt{5}$ is a/an:
a. natural Number
b. integer
c. irrational number
d. rational number
32. If a pole 18 m high casts a shadow 9.6 m long, then the distance of the far end of the shadow from the top of the pole is
a. 24.8 m.
b. 20.4 m.
c. 20 m.
d. 28.4 m.
33. If $(\cos \theta + \sec \theta) = \frac{5}{2}$ then $(\cos^2 \theta + \sec^2 \theta) = ?$
a. $\frac{33}{4}$
b. $\frac{21}{4}$
c. $\frac{17}{4}$
d. $\frac{29}{4}$
34. Which point on x-axis is equidistant from the points A(7, 6) and B(-3, 4)?
a. (-4, 0)
b. (0, 4)
c. (0, 3)
d. (3, 0)
35. If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that it is odd, is
a. $\frac{4}{9}$
b. $\frac{1}{9}$
c. $\frac{5}{9}$
d. $\frac{2}{3}$
36. A system of two linear equations in two variables is dependent consistent, if their graphs
a. do not intersect at any point
b. cut the x-axis
c. intersect only at a point
d. coincide with each other
37. The exponent of 2 in the prime factorisation of 144, is
a. 4
b. 5
c. 6
d. 3
38. If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, then $a^2 + b^2 =$
a. $n^2 - m^2$
b. $m^2 + n^2$
c. $m^2 - n^2$
d. $m^2 n^2$
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39. 3 rotten eggs are mixed with 12 good ones. One egg is chosen at random. The probability of choosing a rotten egg is
- $\frac{1}{15}$
 - $\frac{4}{5}$
 - $\frac{1}{5}$
 - $\frac{2}{5}$
40. The points A(9, 0), B(9, 6), C(-9, 6) and D(-9, 0) are the vertices of a
- rhombus
 - trapezium
 - rectangle
 - square

Section C

Question No. 41 to 45 are based on the given text. Read the text carefully and answer the questions:

Two hotels are at the ground level on either side of a mountain. On moving a certain distance towards the top of the mountain two huts are situated as shown in the figure. The ratio between the distance from hotel B to hut-2 to that of hut-2 to mountain top is 3:7.



41. What is the ratio of the perimeters of the triangle formed by both hotels and mountain top to the triangle formed by both huts and mountain top?
- 5 : 2
 - 7 : 3
 - 3 : 10
 - 10 : 7
42. The distance between the hotel A and hut-1 is
- 2.5 miles
 - 4.29 miles
 - 29 miles
 - 1.5 miles
43. If the horizontal distance between the hut-1 and hut-2 is 8 miles, then the distance between the two hotels is
- 9 miles
 - 2.4 miles

- c. 11.43 miles
- d. 7 miles

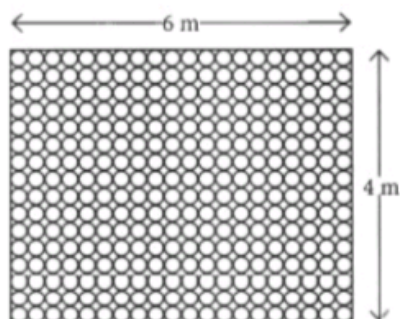
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7 / 20

44. If the distance from mountain top to hut-1 is 5 miles more than that of distance from hotel B to mountain top, then what is the distance between hut-2 and mountain top?
- a. 5.5 miles
 - b. 6 miles
 - c. 3.5 miles
 - d. 4 miles
45. What is the ratio of areas of two parts formed in the complete figure?
- a. 53:21
 - b. 49:51
 - c. 10:41
 - d. 51:33

Question No. 46 to 50 are based on the given text. Read the text carefully and answer the questions:

Renu wants to change the design of the floor of her living room which is of dimensions $6\text{ m} \times 4\text{ m}$ and it is covered with circular tiles of diameters 50 cm each, as shown in the figure.



46. Number of circular tiles along length of room is
- a. 11
 - b. 14
 - c. 13
 - d. 12
47. Total number of circular tiles equals
- a. 92
 - b. 94
 - c. 96
 - d. 90
48. Area covered by each circular tile is
- a. 1960.08 cm^2
 - b. 1980 cm^2
 - c. 1954.28 cm^2
 - d. 1964.28 cm^2
49. Area of rectangular floor is