

SSP-2 – Class 10

SECTION A

- The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$, and $(3, 0)$ is:
 - 5 units
 - 12 units
 - 11 units
 - $7 + \sqrt{5}$ units
- Two circles touch externally at C and AB is a common tangent. Then $\angle ACB$ is:
 - 70°
 - 60°
 - 100°
 - 90°
- The ratio of outer to inner perimeters of a circular path is 23 : 22. If the path is 5 m wide, the diameter of the inner circle is:
 - 55 m
 - 110 m
 - 220 m
 - 230 m
- For which value(s) of λ , do the pair of linear equations $\lambda x + y = \lambda^2$ and $x + \lambda y = 1$ have a unique solution?
- Bells toll together at 9:00 am at intervals of 7, 8, 11, and 12 seconds. How many times will they toll together in the next 3 hours?
- Two tangents inclined at 60° are drawn to a circle of radius 3 cm. Length of each tangent =
 - $\frac{3\sqrt{3}}{2}$ cm
 - 3 cm
 - 6 cm
 - $3\sqrt{3}$ cm
- The point lying on the perpendicular bisector of segment joining $A(-2, -5)$ and $B(2, 5)$ is:
 - $(0, 0)$
 - $(0, -1)$

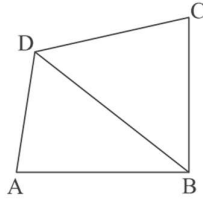
- (c) $(-1, 0)$
(d) $(1, 0)$
8. Distance of point $P(2, -3)$ from the x-axis is:
(a) -3
(b) 2
(c) 1
(d) 3
9. Perimeters of two similar triangles are 26 cm and 39 cm. Ratio of their areas:
(a) $2 : 3$
(b) $6 : 9$
(c) $4 : 6$
(d) $4 : 9$
10. Which pair of linear equations has unique solution $x = 2, y = -3$?
(A) $x + y = -1; 2x - 3y = -5$
(B) $2x + 5y = -11; 4x + 10y = -22$
(C) $2x - y = 1; 3x + 2y = 0$
(D) $x - 4y - 14 = 0; 5x - y - 13 = 0$
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SECTION B

11. Find points on the x-axis at distance $2\sqrt{5}$ from $(7, -4)$. How many such points exist?
12. Father's age is six times son's age. Four years later, father's age will be four times son's age. Present ages are:
(A) $4, 24$
(B) $5, 30$
(C) $6, 36$
(D) $3, 24$
13. Zeroes of $x^2 + 99x + 127$ are:
(A) both positive
(B) both negative
(C) one positive, one negative
(D) both equal
14. Product of a non-zero rational and an irrational number is:
(A) always irrational
(B) always rational

- (C) rational or irrational
(D) 1
15. Area of square inscribed in circle of radius 8 cm:
(a) 256 cm^2
(b) 128 cm^2
(c) $64\sqrt{2} \text{ cm}^2$
(d) 64 cm^2
16. If θ is acute and $\tan \theta + \cot \theta = 2$, then $\sin^3 \theta + \cos^3 \theta =$
(a) 1
(b) $\frac{1}{2}$
(c) $\frac{\sqrt{2}}{2}$
(d) $\sqrt{2}$
17. If p and q are zeroes of $f(x) = 2x^2 - 7x + 3$, then $p + q - pq =$
(a) 1
(b) 2
(c) 3
(d) None
18. (Same as Q4) Frequency of class 30–40 = 3.
19. Assertion (A): If n -th term of AP is $7 - 4n$, common difference = -4 .
Reason (R): $d = a_{n-1} - a_n$.
(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true
20. Assertion (A): In a hemisphere of radius 10 cm, a cone of same radius is removed. Remaining surface area = 570.74 cm^2 .
Reason (R): Surface area = CSA of hemisphere + CSA of cone.
(a) Both true, R explains A
(b) Both true, R does not explain A
(c) A true, R false
(d) A false, R true

21. In figure, ABCD is quadrilateral, BD bisects $\angle B$ and $\angle D$. Prove:



- (i) $\triangle ABD \sim \triangle CBD$
 (ii) $AB = BC$

22. True/False: The only k for which $kx^2 + x + k$ has equal zeros is $\frac{1}{2}$. Justify?

23. Short hand = 4 cm, long hand = 6 cm. Find sum of distances travelled by tips in 2 days.

24. Two chords AB and CD intersect at P. Prove:

- (i) $\triangle APC \sim \triangle DPB$
 (ii) $AP \cdot PB = CP \cdot DP$

OR

Two taps together fill tank in 6 hr. Larger tap takes 9 hr less than smaller. Find time each tap takes separately.

25. Perimeter of semicircular protractor = 108 cm. Find diameter. (Take $\pi = \frac{22}{7}$)

OR

If distance between $(x, -1)$ and $(3, 2)$ is 5, find x .

SECTION C

26. If $\sin \theta + \cos \theta = \sqrt{3}$, prove $\tan \theta + \cot \theta = 1$.

OR

Prove:

$$\frac{1 + \tan A}{2 \sin A} + \frac{1 + \cot A}{2 \cos A} = \cos A + \sec A$$

27. Two pipes fill pool in 12 hr. If larger used 4 hr and smaller 9 hr, only half fills. Find times separately.

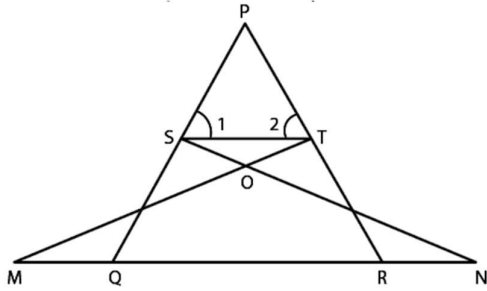
28. Two numbers in ratio 5 : 6. If 8 subtracted from each, ratio becomes 4 : 5. Find numbers.

29. If $x + 1$ is factor of $2x^3 + ax^2 + 2bx + 1$, and $2a - 3b = 4$, find a, b .

30. Write a pair of linear equations with unique solution $x = -1, y = 3$. How many such pairs?

OR

In figure, if $\angle 1 = \angle 2$ and $\triangle NSQ \cong \triangle MTR$, prove $\triangle PTS \sim \triangle PRQ$.



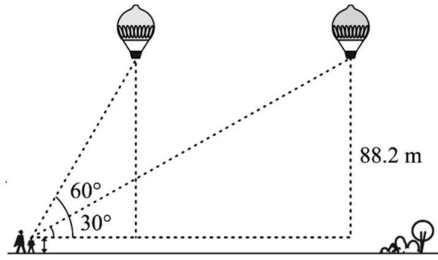
SECTION D

31. If $1 + \sin^2 \theta = 3 \sin \theta \cos \theta$, prove $\tan \theta = 1$ or $\frac{1}{2}$.
32. If Zeba were 5 years younger, square of her age would exceed 5 times actual age by 11. Find her present age.
33. If a, b are zeroes of $2x^2 - 5x + 7$, find polynomial with zeroes $2a + 3b$ and $3a + 2b$.
34. Sum of 3rd and 7th terms of AP = 6, product = 8. Find sum of first 16 terms.
35. Rectangular block: $15 \text{ cm} \times 10 \text{ cm} \times 5 \text{ cm}$. A circular hole of diameter 7 cm drilled out. Find:
 - (i) volume of remaining solid
 - (ii) surface area of remaining solid.

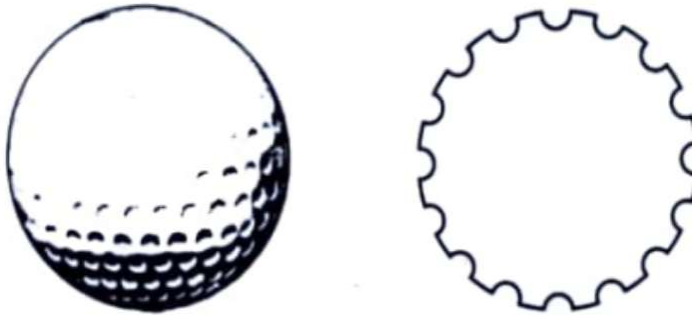
SECTION E (Case-based)

36. Aditya runs 200 m in 51 sec, wants 31 sec. Each day improves by 2 sec.
 - (i) Days needed to reach 31 sec?
 - (ii) Difference between time on 5th and 7th day?OR
Which term of AP 3, 15, 27, 39... is 120 more than 21st term?
37. A girl 1.2 m tall sees balloon at height 88.2 m. Angle of elevation changes from 60° to 30° in 30 sec.
 - (i) Distance balloon travelled in interval.
 - (ii) Speed of balloon.

(iii) If sun's elevation = 30° , length of shadow of 150 ft tower.



38. A golf ball is spherical with about 300-500 dimples that help increase its velocity while in play. Golf balls are traditionally white but available in colours also. In the given figure, a golf ball has diameter 4.2 cm and surface has 315 dimples (hemispherical) of radius 2mm.



Based on the above information answer the following questions (i) Find the surface area of 1 such dimple (ii) Find the volume of the material dug out to make 1 dimple (iii) (a) find the total surface area exposed to the surrounding Or (b) Find the volume of the golf ball