INDIAN SCHOOL AL WADI AL KABIR

Department: Mathematics

Class X **Sample paper (Set 2)** **20-12-20**

Qn. no:	Part A
	Section I has 16 questions of 1 mark each.
Q.1.	If HCF (336, 54) = 6, find LCM (336, 54).
Q.2.	Find the 25^{th} term of the A.P. $-5, \frac{-5}{2}, 0, \frac{5}{2}, \ldots$
Q.3.	Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$.
Q.4.	Evaluate : $\sin^2 60° + 2 \tan 45° - \cos^2 30°$
Q.5.	Find the value of k for which x = 2 is a solution of the equation $kx^2 + 2x - 3 = 0$.
Q.6.	The area of two similar triangles are 25 sq. cm and 121 sq. cm. Find the ratio of their corresponding sides.
Q.7.	A ladder 15 m long makes an angle of 60° with the wall. Find the height of the point where the ladder touches the wall.
Q.8.	A solid metallic cuboid of dimensions $9 \text{ m} \times 8 \text{ m} \times 2 \text{ m}$ is melted and recast into solid cubes of edge 2 m. Find the number of cubes so formed.
Q.9	If the distance between the points $(4, k)$ and $(1, 0)$ is 5, then what can be the possible values of k ?
Q.10	What is the probability of getting a number less than 5 when a die is thrown once ?

Q.11 If α and β are zeroes of the polynomial $p(x) = x^2 - 5x + 6$, then the value of $\alpha + \beta - 3\alpha\beta$ is

Q.12. For what value of k, the pair of equations $4x - 3y = 9$, $2x + ky = 11$ has no solution

Q.13. The mean of the following distribution is :

Classes	0 – 10	10 – 20	20 – 30	30 – 40
Frequencies	1	2	2	1

Q.14. If the angle between two tangents drawn from an external point P to a circle of radius a and centre O, is 60°, then find the length of OP.

Q.15. For which value(s) of p, will the lines represented by the following pair of linear equations be parallel

$$3x - y - 5 = 0$$
$$6x - 2y - p = 0$$

Q.16. Volume and surface area of a solid hemisphere are numerically equal.

What is the diameter of hemisphere ?

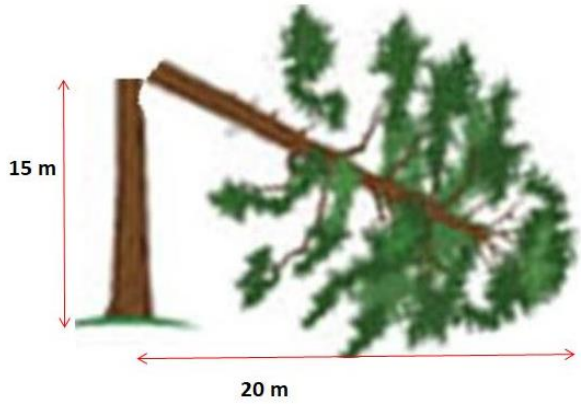
Section II (1 x 4 = 4 marks each)

Case study-based questions are compulsory. Each subpart carries 1 mark.

Q.17. Suresh is having a garden near Delhi. In the garden, there are different types of trees and flower plants. One day due to heavy rain and storm one of the trees got broken as shown in the figure.

The height of the unbroken part is 15m and the broken part of the tree has fallen 20m away from the base of the tree,

Using the Pythagoras theorem, answer the following questions:



(a) What is the length of the broken part?

(i) 15m (ii) 20m (iii) 25m (iv) 30m

(b)	What is the actual height of the tree? (i) 40m (ii) 50m (iii) 35m (iv) 30m
(c)	What is the area of the right -angled triangle formed? (i) $100m^2$ (ii) $200m^2$ (iii) $60m^2$ (iv) $150m^2$
(d)	What is the perimeter of the triangle formed? (i) 60m (ii) 50m (iii) 45m (iv) 100m
Q.18.	 Students of Class 10 were taken to Red Fort as part of their Educational trip. The teacher narrated the facts of Red Fort to the students. The teacher said in this monument one can find combination of solid figures. There are 2 pillars which are cylindrical in shape. Also 2 domes at the corners which are hemispherical and 7 smaller domes at the centre.
(a)	How much cloth material will be required to cover 2 big domes each of radius 2.5m? (Take $\pi = \frac{22}{7}$) (i) $75m^2$ (ii) $78.57m^2$ (iii) $87.47m^2$ (iv) $25.8m^2$
(b)	Find the curved surface area of two cylindrical pillars if height of the pillar is 7m and radius of the base is 1.4m. (i) $112.3cm^2$ (ii) $123.2m^2$ (iii) $90m^2$ (iv) $345.2cm^2$
(c)	Find the volume of a hemisphere if the radius of the base is 3.5m? (i) $85.9m^3$ (ii) $80m^3$ (iii) $90m^3$ (iv) $89.83m^3$
(d)	The formula to find the volume of a cylindrical pillar is (i) $\pi r^2 h$ (ii) πrl (iii) $\pi r(l + r)$ (iv) $2\pi r$

Q.19. A fruit vendor was selling apples in packing boxes containing varying number of apples.

No. of apples	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55
No. of boxes	25	34	50	42	38	13

(a) Estimate the modal number of mangoes kept in the boxes

(i) 37 (ii) 38.3 (iii) 36.7 (iv) 53.8

(b) What is the lower limit of the median class?

(i) 40 (ii) 45 (iii) 30 (iv) 35

(c) The difference of upper limits of modal class and median class is

(i) 70 (ii) 0 (iii) 5 (iv) 80

(d) How many boxes contain more than 40 apples?

(i) 51 (ii) 109 (iii) 93 (iv) 126

Q.20. Hit the Target

Archery is the sport of shooting at targets using a bow and arrow. Archery target is formed with concentric circles. Look at the figure shown here.

The figure depicts an archery target marked with its five scoring areas from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is 21cm and each of the other bands is 10.5cm wide.

(a)	The area of region representing Gold scoring area is (i) $346.5cm^2$ (ii) $372cm^2$ (iii) $368.85cm^2$ (iv) $390cm^2$
(b)	Radius of the region representing Gold and Red scoring areas is (i) 42cm (ii) 52.5cm (iii) 21cm (iv) 44cm
(c)	The diameter of the archery target is (i) 90cm (ii) 100cm (iii) 105cm (iv) 110cm
(d)	Radius of the region representing Gold, Red, Blue scoring areas is (i) 10.5cm (ii) 21cm (iii) 42cm (iv) 84cm

Part B:

Section III (2 marks each)

Q.21.	**Points A(3, 1), B(5, 1), C(a, b) and D(4, 3) are vertices of a parallelogram ABCD. Find the values of a and b.**
Q.22.	**On a morning walk, three persons step out together and their steps measure 30 cm, 36 cm and 40 cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps ?**
Q.23.	Form a quadratic polynomial whose zeroes are $5+\sqrt{3}$ and $5-\sqrt{3}$.
Q.24.	If $4\cos\theta = 11\sin\theta$, find the value of $\frac{11\cos\theta - 7\sin\theta}{11\cos\theta + 7\sin\theta}$.
Q.25.	Write the relationship connecting three measures of central tendencies. Hence find the median of the given data if mode is 24.5 and mean is 29.75.
Q.26.	2 cubes, each of volume 125 cm^3, are joined end to end. Find the surface area of the resulting cuboid.

Section IV (3 marks each)

Q.27.

Solve $\frac{x}{a} + \frac{y}{b} = a + b$

$\frac{x}{a^2} + \frac{y}{b^2} = 2, \quad a, b \neq 0$

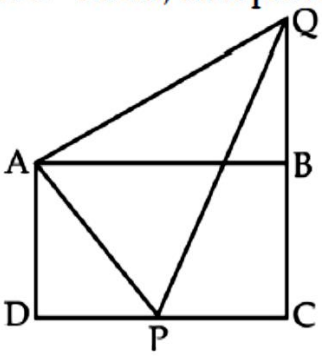
Q.28.

If the mean of the following data is 21.5, find the value of k.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	6	4	3	k	2

Q.29.

In the given figure, ABCD is a rectangle. P is midpoint of DC. If QB = 7 cm, AD = 9 cm and DC = 24 cm, then prove that $\angle APQ = 90°$.

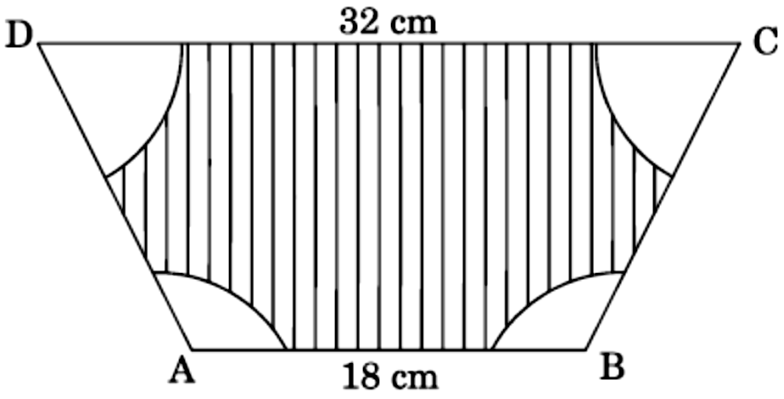


Q.30.

Water is flowing at the rate of 5 km/hour through a pipe of diameter 14 cm into a tank with rectangular base which is 50 m long and 44 m wide. Find the time in which the level of water in the tank rises by 7 cm. (Use $\pi = \frac{22}{7}$)

Q.31.

From a point on the ground, the angles of elevation of the bottom and the top of a tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

Q.32.	In the given figure, ABCD is a trapezium with AB ∥ DC, AB = 18 cm, DC = 32 cm and the distance between AB and AC is 14 cm. If arcs of equal radii 7 cm taking A, B, C and D as centres, have been drawn, then find the area of the shaded region. 
Q.33.	Draw two concentric circles of radii 3 cm and 5 cm. Taking a point on the outer circle, construct the pair of tangents to the inner circle.
	Section V (5 marks each)
Q.34.	Prove that : $\frac{\tan^3\theta}{1+\tan^2\theta}+\frac{\cot^3\theta}{1+\cot^2\theta}=\sec\theta\,\text{cosec}\,\theta-2\sin\theta\cos\theta$
Q.35.	A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20 m high building, finds the elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl. (Given $\sqrt{2}$ = 1·414)
Q.36.	From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4·2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1·4 cm thickness. Find the length of the wire. [Use $\pi=\frac{22}{7}$]

ANSWERS

Q.1	3024	**Q.2**	55	**Q.3**	No real roots	**Q.4**	2
Q.5	k = $\frac{-1}{4}$	**Q.6**	5:11	**Q.7**	7.5m	**Q.8**	18
Q.9	k = $\pm$ 4	**Q.10**	$\frac{2}{3}$	**Q.11**	-13	**Q.12**	k = $\frac{-3}{2}$
Q.13	20	**Q.14**	2a	**Q.15**	p≠10	**Q.16**	d = 9 units
Q.17	(a) (iii), (b) (i) (c)(iv), (d) (i)	**Q.18**	(a) (ii), (b) (ii) (c)(iv), (d) (i)	**Q.19**	(a) (ii), (b) (iv) (c)(ii), (d) (iii)	**Q.20**	(a) (i), (b) (iii) (c)(iii), (d) (iii)
Q.21	a = 6, b = 3	**Q.22**	360cm	**Q.23**	x^2 – 10x + 22	**Q.24**	$\frac{93}{149}$
Q.25	28	**Q.26**	250cm^2	**Q.27**	x = a^2, y = b^2	**Q.28**	k = 5
Q.30	2 hours	**Q.31**	20($\sqrt{3}$ – 1) m	**Q.32**	196cm^2	**Q.35**	42.42m
Q.36	158.4cm						

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