



INDIAN SCHOOL SOHAR
PRE-BOARD EXAM: 2017-2018
MATHEMATICS

No. of printed pages: 4

Class: X
Date: 30.01.2018

Maxi. Marks: 80
Time: 3 Hours

General Instructions:

- (i) All questions are compulsory
- (ii) The question paper consists of 30 questions divided into four sections A, B, C and D.
- (iii) Section A contains 6 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 8 questions of 4 marks each.
- (iv) There is no overall choice. However, internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

SECTION A

Question numbers 1 to 6 carry 1 mark each.

1. Find the 10th term of the AP $\sqrt{2}, \sqrt{8}, \sqrt{18}, \dots$
2. Find the product of $\cos 30^\circ \cdot \cos 60^\circ \cdot \cos 90^\circ$.
3. Find the area of triangle formed by coordinates A(0, 0), B(a, 0) and C(0, -b).
4. Write HCF of the smallest composite number and the smallest prime number.
5. ΔABC and ΔBDE are two equilateral triangles such that D is mid- point of BC. Find the ratio of the areas of ΔABC and ΔEBD .
6. Find the discriminant of the quadratic equation $13\sqrt{3}x^2 + 10x + \sqrt{3} = 0$

SECTION B

Question numbers 7 to 12 carry 2 marks each.

7. Find the 10th term from the end of the A.P. 4, 9, 14,, 254.
8. In what ratio does the y axis divide the line segment joining the points (-4, 5) and (3, -7).
9. A bag contains 5 white balls, 4 black balls and 3 blue balls. One ball is drawn at random from the bag. Find the probability that the ball drawn is :
(i) White or blue (ii) neither white nor black
10. For what value of k will the following pair of linear equations have infinitely many solutions?
 $2x - 3y = 7, (k + 1)x + (-2k)y = 5k - 4$
11. A box contains 20 balls bearing numbers 1, 2, 3, 4,20. A ball is drawn at random from the box. What is the probability that the number on the ball is:
(i) an odd number (ii) divisible by 2 and 3
12. Using Euclid's division algorithm, find the HCF of 125 and 425.

SECTION C

Question numbers 13 to 22 carry 3 marks each.

13. Prove that one and only one out of n, n + 1 and n + 2 is divisible by 3.

14. If the point C (-1, 2) divides internally the line-segment joining the points A (2,5) and B(x, y) in the ratio 3 : 4, find the value of $x^2 + y^2$.

OR

Three vertices of a parallelogram taken in order are (1, 2), (2, 4) and (3, 7). Find its fourth vertex.

15. With out using trigonometric tables, find the value of $\tan 10^\circ \tan 20^\circ \tan 30^\circ \tan 70^\circ \tan 80^\circ$ –

$$\frac{\sin 15^\circ \cos 75^\circ + \cos 15^\circ \sin 75^\circ}{\cos \theta \sin (90^\circ - \theta) + \sin \theta \cos (90^\circ - \theta)}$$

OR

Show that $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$

16. If in a right angle ΔABC , right angled at C, P and Q are the middle points of BC and AC, then prove that $AP^2 + BQ^2 = 5 PQ^2$

OR

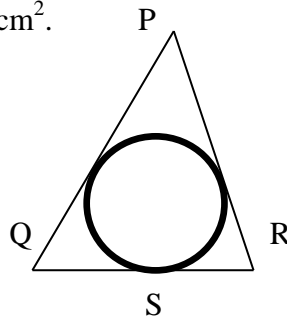
Prove that the area of an equilateral triangle described on the side of a square is half the area of the equilateral described on its diagonal.

17. A bucket made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of the bucket if the cost of metal sheet used is Rs 15 per 100 cm^2 . (Use $\pi = 3.14$)

OR

A well of diameter 3 m, is dug 14 m. The earth taken out of it has been spread evenly all around it to a width of 4 m, form an embankment. Find the height of the embankment. (use $\pi = \frac{22}{7}$)

18. In the given figure ΔPQR is drawn to circumscribe a circle of radius 3 cm such that the segment QS and RS into which QR is divided by the point of contact S, are of length 6 cm and 8 cm respectively. Find the side PQ if the area of $\Delta PQR = 63 \text{ cm}^2$.



19. Father's age is three times the sum of ages of two children. After 5 years his age will be twice the sum of age of two children. Find the age of the father.

20. Check whether polynomial $x - 3$, is a factor of the polynomial $x^3 - 3x^2 - x + 3$. Verify by division algorithm.
21. A chord of a circle of radius 14 cm subtends an angle of 120° at the centre. Find the area of the corresponding minor segment of the circle.(use $\pi = \frac{22}{7}$ and $\sqrt{3} = 1.73$)
22. Change the following data into more than type distribution and draw its ogive

Height (in cm)	135-140	140-145	145-150	150-155	155-160	160-165
Number of girls	5	8	9	12	14	2

SECTION D

Question numbers 23 to 30 carry 4 marks each.

23. Draw a ΔABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle BAC = 60^\circ$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of triangle ABC .
24. Solve for x: $\frac{4x-3}{2x+1} - 10\left(\frac{2x+1}{4x-3}\right) = 3, x \neq \frac{-1}{2}, \frac{3}{4}$

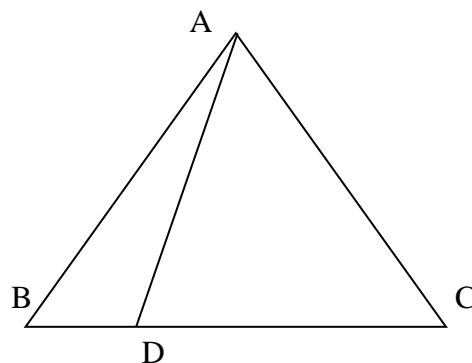
OR

A pole has to be erected at a point on the boundary of a circular park of diameter 17 m in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7m. Find the distances from the two gates where the pole is to be erected.

25. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

OR

In an equilateral triangle ABC , a point D is taken on base BC such that $BD : DC = 1 : 2$. Prove that $9AD^2 = 7AB^2$.



26. The sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289. Find the sum of first n terms.

27. A man standing on the deck of a ship, which is 15 m above the water level, observes the angle of elevation of the top of the hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.

28. Prove that $\frac{\operatorname{cosec} A}{\operatorname{cosec} A - 1} + \frac{\operatorname{cosec} A}{\operatorname{cosec} A + 1} = 2 \sec^2 A$.

29. Find the values of x and y if the median of the following data is 31

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
Frequency	5	x	6	y	6	5	40

OR

Using step-deviation method, calculate the mean of the following grouped distribution.

Class	10-30	30-50	50-70	70-90	90-110	110-130	Total
Frequency	5	8	12	20	3	2	50

30. Due to heavy floods in a State, thousands were rendered homeless. 50 schools collectively offered to the State Government to provide place and canvas for 500 tents to be fixed by the Government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of slant height 3.5 m. If the canvas used to make the tents costs Rs. 120 per sq. m, find the amount shared by each school to set up the tents. What value is generated by the above problem? (Use $\pi = \frac{22}{7}$)
