K12 ASPIRE

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CLASS X CBSE MATHS PRE-BOARD PAPER 1

General Instructions

1. The question paper comprises four sections, A and B, C and D . You are to attempt all the sections.

2. All questions are compulsory however some questions are provided with internal choices to select from.

3. Question numbers 1 to 6 in section A carry one mark each.

4. Question numbers 7 to 12 in section B carry two marks each.

5. Question numbers 13 to 19 in section C carry three marks each.

6. Question numbers 20 to 30 in section D carry four marks each.

Section - A

1. What is the value of $(\cos^2 67° - \sin^2 23°)$?

   (OR)

   Find the value of $(\sin 30° + \cos 60°)$

2. In an A.P. if the common difference = -4 and the seventh term (a_7) is 4, them find the first term.

3. Given $\triangle ABC \sim \triangle PQR$, if $AB/PQ = 1/3$, then find $ar\triangle ABC /ar\triangle PQR$.

4. What is the HCF of the smallest prime number and the smallest composite number.

5. Find the distance of a point $P(x, y)$ from the origin.

6. If x=3 is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k.

   (OR)

   Find the value of k for which the equation $x^2 + k(2x+k-1) + 2 = 0$ has real and equal roots.

Section – B

7. Find the greatest number which divides 2011 and 2623 leaving remainder 9 and 5 respectively.

   (OR)

   Find the H.C.F. of 84 and 144 by prime factorisation method. Hence find their L.C.M.

8. If the pth term of an A.P. is q and the qth term is p. Prove that it's n^{th} term is (p+q-n).

   (OR)

   The fifth term of an A.P. is 1 whereas it's 31st term is -77. Which term of the A.P. is -17 ?

9. Solve : $37x + 41y = 70$, $41x + 37y = 86$

10. If the point p(m ,3) lies on the line segment joining the points A (-2/5 , 6) and B(2,8). Find the value of m.

11. A bag contains cards which are numbered from 2 to 90. A card is drawn at random from the bag. Calculate the probability that it bears a two digit number.

12. A right circular cylinder and a cone have equal bases and equal heights.If their curved surface areas are in the ratio 8 : 5,show that the ratio between radius of their bases to their heights is 3 : 4.

Section – C

13. Using Euclid's division algorithm, find the HCF of the numbers 867 and 255.

14. Divide 27 into two parts such that the sum of their reciprocal is 3 / 20.

15. In an A.P. if sum of it's first n terms is $3n^2 + 5n$ and it's k^{th} term is 164. Find the value of k.

16. If co-ordinates of two adjacent vertices of a parallelogram are (3,2) , (1 ,0) and diagonals bisect each other at (2 , -5). Find the co-ordinates of the other two vertices.

   (OR)

   If the area of triangle with vertices (x,3),(4,4) and (3,5) is 4 square units, find x.

17. In the given figure AB is a chord of length 8 cm of a circle of radius 5 cm. The tangents to the circle at A and B intersect at P. Find the length of AP.
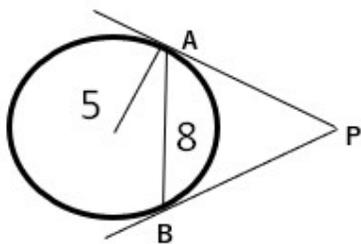
   (OR)

   Prove that the length of tangent drawn from an external point to a circle are equal.

18. Construct a triangle with sides 6 cm, 8 cm and 10 cm. Construct another triangle whose sides are 3/5 of the corresponding sides of original triangle.

19. Prove that $1 + \tan^2 A / 1 + \cot^2 A = (1 - \tan A / 1 - \cot A)^2 = \tan^2 A$

    (OR)

    Evaluate :

    $\cos 58° / \sin 32° + \sin 22° / \cos 68° - \cos 38° \csc 52° / \sqrt{3} (\tan 18° \tan 35° \tan 60° \tan 72° \tan 55°)$

20. The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 48 hours.

    (OR)

    The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square.

21. If $\sin (A + 2B) = \sqrt{3}/2$, $\cos (A + 4B) = 0$, $A > B$ and $A + 4B \leq 90°$, then find A and B.

22. By changing the following distribution 'to less than typ distribution', draw it's ogive.

Classes	0-15	15-30	30-45	45-60	60-75
Frequency	6	8	10	6	4

Section – D

23. A train takes 2 hours less for a journey of 300 km if it's speed is increased by 5 km/hr from it's usual speed. Find the usual speed of the train .

    (OR)

    Solve for x : $1 / a + b + x = (1 / a) + (1 / b) + (1 / x)$, $[a \neq 0 , b \neq 0 , x \neq 0, x \neq - (a + b)]$

24. An A.P. consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

25. Prove that in a right angled triangle , square of the hypotenuse is equal to the sum of the squares of two sides.

26. For what values of m and n , the following system of linear equations has infinitely many solutions .

    $3x + 4y = 12$

    $(m + n) x + 2 (m - n) y = 5m -1$

27. A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45°, how long will the car take to reach the observation tower from this point ?

    (OR)

    The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30° and the angle of depression of it's shadow from the same point in water of lake is 60°. Find the height of the cloud from the surface of water.

28. The median of the following data is 525. Find the values of x and y if the total frequency is 100.

Class interval	Frequency
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	y
700-800	9
800-900	7
900-1000	4

(OR)

Find the mean and mode for the following data :

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	8	10	12	10	4	2

29. The radii of circular ends of a bucket of height 24 cm and 15 cm and 5 cm. Find the area of it's curved surface.

30. If sec θ + tan θ = p, then find the value of cosec θ