

CBSE Board
Class X – Set 3
Mathematics
Board Question Paper 2018

Time: 3 hrs.

Marks: 80

Note:

- Please check that this question paper contains **11** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **30** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

General Instructions:

- (i) **All** questions are compulsory.
- (ii) This 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 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, an internal choice has been provided in four questions of **3** marks each and **3** questions of **4** marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

SECTION A

Question numbers **1** to **6** carry **1** mark each.

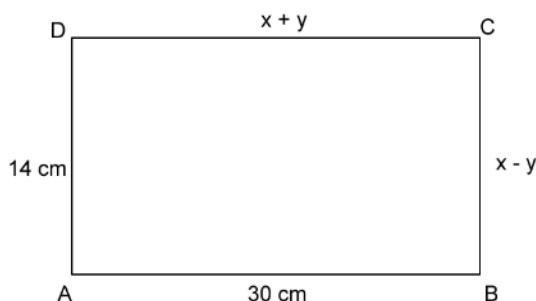
1. What is the value of $(\cos^2 67^\circ - \sin^2 23^\circ)$?
2. In an AP. if the common difference $(d) = -4$, and the seventh term (a_7) is 4, then find the first term.
3. Given $\triangle ABC \sim \triangle PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{\text{ar}\triangle ABC}{\text{ar}\triangle PQR}$.
4. What is the HCF of 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 .

SECTION B

Question numbers 7 to 12 carry 2 marks each.

7. Two different dice are tossed together. Find the probability:
 - (i) of getting a doublet
 - (ii) of getting a sum 10, of the numbers on the two dice.
8. Find the ratio in which $P(4, m)$ divides the line segment joining the points $A(2, 3)$ and $B(6, -3)$. Hence find m .
9. An integer is chosen at random between 1 and 100. Find the probability that it is:
 - (i) divisible by 8.
 - (ii) not divisible by 8.
10. In the given figure ABCD is a rectangle. Find the values of x and y .



11. Find the sum of first 8 multiples of 3.
12. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number.

SECTION - C

Question numbers 13 to 22 carry 3 marks each.

13. If $A(-2, 1)$, $B(a, 0)$, $C(4, b)$ and $D(1, 2)$ are the vertices of a parallelogram ABCD, find the values of a and b . Hence find the lengths of its sides.

OR

If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of quadrilateral ABCD.

14. Find all zeros of the polynomial $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$ if two of its zeros are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$.
15. Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.
16. Prove that the lengths of tangents drawn from an external point to a circle are equal.
17. Prove that the area of an equilateral triangle described on one side of the square is equal to half the area of the equilateral triangle described on one of its diagonal.

OR

If the areas of two similar triangles are equal, prove that they are congruent

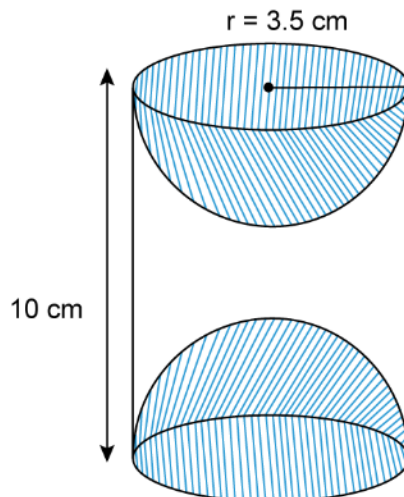
18. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time it had to increase its speed by 100 km/h from the usual speed. Find its usual speed.
- 19.

The table below shows the salaries of 280 persons :

Salary (In thousand)	No. of persons
5-10	49
10-15	133
15-20	63
20-25	15
25-30	6
30-35	7
35-40	4
40-45	2
45-50	1

Calculate the median salary of the data.

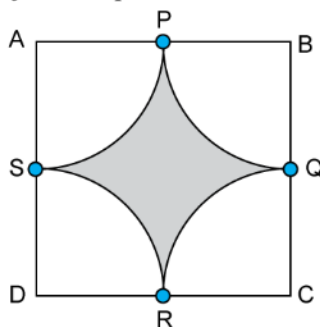
20. A wooden article was made by scooping out of hemisphere from each end of a solid cylinder, as shown in given figure. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. find the total surface area of the article.



OR

A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

21. Find the area of the shaded region in the given figure, where areas drawn with centres A,B,C and D intersect in pairs at mid-points P, Q, R and S of the sides AB, BC, CD and DA respectively of a square ABCD of side 12 cm (Use $\pi = 3.14$)



22. if $4 \tan \theta = 3$, evaluate $\left(\frac{4 \sin \theta - \cos \theta + 1}{4 \sin \theta - \cos \theta - 1} \right)$

OR

If $\tan 2A = \cot (A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .

SECTION - D

Question numbers 23 to 30 carry 4 marks each.

23. As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships.
(Use $\sqrt{3}=1.732$)
24. The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30 cm respectively. If its height is 24 cm, find:
(i) The area of the metal sheet used to make the bucket.
(ii) Why we should avoid the bucket made by ordinary plastic? (Use $\pi = 3.14$)
25. Prove that : $\frac{\sin A - 2 \sin^3 A}{2 \cos^3 A - \cos A} = \tan A$.
26. The mean of the following distribution is 18. Find the frequency f of the class 19-21.

Class	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	6	9	13	f	5	4

OR

The following distribution gives the daily income of 50 workers of a factory:

Daily Income (In)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type of cumulative frequency distribution and draw its ogive.

27. A motor boat whose speed is 18km/hr in still water takes 1hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed?

28. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7:15. Find the numbers.
29. Draw a triangle ABC with $BC = 6$ cm $AB = 5$ cm and $\angle ABC = 60^\circ$ Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the ΔABC .
30. In an equilateral ΔABC , D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9(AD)^2 = 7(AB)^2$

OR

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