

GENERAL INSTRUCTIONS

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into 4 sections – A, B, C & D. Section A comprises of six questions of 1 mark each, Section B comprises of six questions of 2 marks each, Section C comprises of ten questions of 3 marks each and Section D comprises of eight questions of 4 marks each.
3. All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.
4. There is no overall Choice in the paper. However, an internal choice has been provided in two questions of 3 marks each and two questions of 4 marks each. You have to attempt only one of the alternative in all such questions.
5. In question on construction, the drawings should be neat and exactly as per the given measurements.
6. Use of calculators is not permitted.

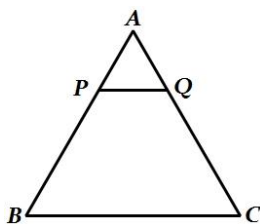
SECTION A

1. If the mid-point of the line segment joining the points $P(6, b - 2)$ and $Q(-2, 4)$ is $(2, -3)$, find the value of b .
2. Write whether the rational number $\frac{91}{175}$ will have a terminating or a non-terminating decimal representation.
3. Without drawing the graph, find out whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident:

$$9x - 10y = 21$$

$$\frac{3}{2}x - \frac{5}{3}y = \frac{7}{2}$$

4. In Figure, $PQ \parallel BC$ and $AP:PB = 1:2$. Find $\frac{ar(\Delta APQ)}{ar(\Delta ABC)}$.



5. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$
6. If $\sin \theta = \frac{1}{3}$, then find the value of $(2 \cot^2 \theta + 2)$.

SECTION B

7. If two positive integers p and q are written as $p = ab^3$ and $q = a^3b^2$; a, b are prime numbers, then verify:
 $LCM(p, q) \times HCF(p, q) = pq$
8. If the ratio of sum of the first m and n terms of an A.P. is $m^2 : n^2$, show that the ratio of its m^{th} and n^{th} terms is $(2m - 1) : (2n - 1)$.
9. Which term of the sequence 114, 109, 104, .. is the first negative term?

10. Find the value of p , for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.
11. Find the ratio in which the point $(-3, k)$ divides the line-segment joining the points $(-5, -4)$ and $(-2, 3)$. Also, find the value of k .
12. A bag contains 4 red, 5 black and 3 yellow balls. A ball is taken out of the bag at random. Find the probability that the ball taken out is of
- yellow colour
 - not of red colour.

SECTION C

13. The sum of two numbers is 8. Determine the numbers if the sum of their reciprocals is $\frac{8}{15}$.
14. The line segment joining the points $A(2, 1)$ and $B(5, -8)$ is trisected at the point P and Q such that P is nearer to A . If P also lies on the line given by $2x - y + k = 0$, find the value of k .

OR

Show that $A(-3, 2)$, $B(-5, -5)$, $C(2, -3)$ and $D(4, 4)$ are the vertices of a rhombus.

15. Without using trigonometric tables, evaluate the following:

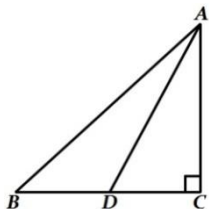
$$2 \left(\frac{\cos 58^\circ}{\sin 32^\circ} \right) - \sqrt{3} \left(\frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\tan 15^\circ \tan 60^\circ \tan 75^\circ} \right)$$

OR

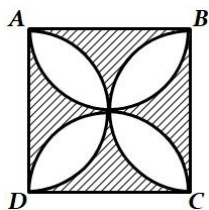
Prove that:

$$\sec^2 \theta - \frac{\sin^2 \theta - 2 \sin^4 \theta}{2 \cos^4 \theta - \cos^2 \theta} = 1$$

16. Prove that $\sqrt{5}$ is an irrational number.
17. What must be added to $6x^5 + 5x^4 + 11x^3 - 3x^2 + x + 1$, so that the polynomial so obtained is exactly divisible by $3x^2 - 2x + 4$?
18. In Fig. ABC is a right triangle, right angled at C and D is the mid-point of BC . Prove that $AB^2 = 4AD^2 - 3AC^2$.



19. In figure, $ABCD$ is a square of side 14 cm . Semi-circles are drawn with each side of square as diameter. Find the area of the shaded region. (use $\pi = \frac{22}{7}$)



20. Prove that the lengths of tangents drawn from an external point to a circle are equal.
21. Find the median of the following data:

Class interval	0- 20	20- 40	40- 60	60- 80	80- 100	100- 120
Frequency	7	8	12	10	8	5

22. A solid right-circular cone of height 60 cm and radius 30 cm is dropped in a right-circular cylinder full of water of height 180 cm and radius 60 cm . Find the volume of water left in the cylinder, in cubic metres. [Use $\pi = \frac{22}{7}$]

SECTION D

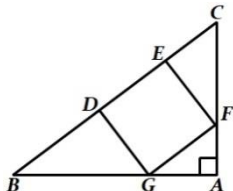
23. If $\tan \theta + \sin \theta = m$ & $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$.
24. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{3}{4}$. Find the original fraction.

OR

Solve for x :

$$\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}, x \neq -1, -\frac{1}{5}, -4$$

25. In Figure, $DEFG$ is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.



26. A vertical pedestal stands on the ground and is surmounted by a vertical flag staff of height 5 m. At a point on the ground the angles of elevation of the bottom and the top of the flag staff are 30° and 60° respectively. Find the height of the pedestal.

OR

A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time take by the car to reach the foot of the tower from this point.

27. Draw 'more than ogive' for the frequency distribution and hence obtain the median.

Class interval	5- 10	10- 15	15- 20	20- 25	25- 30	30- 35	35- 40
Frequency	2	12	2	4	3	4	3

28. Construct an isosceles triangle with base 8 cm and altitude 4 cm. Construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of the isosceles triangle.
29. Find the 60th term of the AP 8, 10, 12, ..., if it has a total of 60 terms and hence find the sum of its last 10 terms?
30. Milk in a container, which is in the form of a frustum of a cone of height 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively, is to be distributed in a camp for flood victims. If this milk is available at the rate of ₹ 35 per litre and 880 litres of milk is needed daily for a camp, find how many such containers of milk are needed for a camp and what cost will it put on the donor agency for this. What value is indicated through this by the donor agency? (use $\pi = \frac{22}{7}$)

Maths – Class X Predicted Paper (Ans. Key and Hints)

SECTION A

1. $b = -8$
2. Terminating
[Hint: Simplify the fraction by dividing numerator and denominator by 7]
3. Coincident
4. $\frac{1}{9}$
5. $D = 64$
6. 18
[Hint: $\operatorname{cosec}^2\theta = 1 + \cot^2\theta$]

SECTION B

7. Hint: HCF $(p, q) = ab^2$ and LCM $(p, q) = a^3b^3$
9. 24^{th} term
10. $p = 3$
11. 2:1 and $k = \frac{2}{3}$
12. I. $\frac{1}{4}$
II. $\frac{2}{3}$

SECTION C

13. 5 and 3
14. $k = -8$
OR
[Hint: Using distance formula find lengths of AB and BC respectively]

15. 1
OR
[Hint: Take $\sin^2\theta$ and $\cos^2\theta$ common from numerator and denominator respectively]
17. $17x - 13$
18. Hint: Use Pythagoras theorem in $\triangle ABC$ & $\triangle ADC$.
19. 84 cm^2
[Hint: Divide into 8 parts and subtract area of sector from the area of square]
21. Median = 56.67
22. 1.98 m^3

SECTION D

23. Hint: $m^2 - n^2 = (m - n)(m + n)$
24. $\frac{1}{4}$
OR
1 or $-\frac{11}{17}$
25. Hint: Prove that $\triangle AGF \sim \triangle DBG$ and $\triangle AGF \sim \triangle EFC$
26. 2.5 m
OR
3 seconds
27. Median = 17.5
29. 126; 1170
30. Number of containers required = 10
Cost on donor agency = ₹ 30800
Value: Helping fellow human beings.