

Practice paper
CLASS – X
SUBJECT : MATHEMATICS

General Instructions :

Answer all the questions. Show the necessary rough work on the right hand side of the page containing the respective answer.

Questions 1 – 6 carry of 1 mark each.

Questions 7 – 12 carry 2 marks each.

Questions 13 – 22 carry 3 marks each.

Questions 23 – 30 carry 4 marks each

SECTION – A

- Q.1. Find HCF of 81 and 237 using Euclid's division algorithm.
- Q.2. Show that 2 is not a zero of the polynomial $x^3 - 13x^2 + 54x - 72$
- Q.3. Find the value of k for which the pair of equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represents parallel lines.
- Q.4. The perimeter of two similar triangles is 30 cm and 20 cm respectively. If one side of the first triangle is 12 cm, find the length of the corresponding side of the second triangle.
- Q.5. Find the value of $2\sin^2 30^\circ - 3\cos^2 45^\circ + \tan^2 60^\circ$
- Q.6. Two dice are rolled once. Find the probability of getting such numbers on two dice, whose product is a perfect square.

SECTION – B

- Q.7. Write an equation of a line passing through the point of intersection of two lines represented by the equations $x + y = 2$ and $2x - y = 1$
- Q.8. A triangle has sides 5 cm, 12 cm and 13 cm. Find the length of the perpendicular from the opposite vertex to the side of length 13 cm (correct to one decimal place)
- Q.9. If the zeroes of the polynomial $x^2 - px + q$ be in the ratio 2:3, prove that $6p^2 = 25q$
- Q.10. If the radius of the base of a right circular cylinder is halved, keeping the height same, then what is the ratio of the volume of the cylinder thus obtained to the volume of the original cylinder?
- Q.11. Find the area of the segment of a circle of radius 14 cm, if the length of the corresponding arc is 22cm
- Q.12. If the points $(3, 3)$, $(h, 0)$ and $(0, k)$ are collinear, prove that $\frac{1}{h} + \frac{1}{k} = \frac{1}{3}$

SECTION – C

- Q.13. Find the zeroes of the polynomial $x^3 - 15x^2 + 71x - 105$, given that the zeroes are in A.P
- Q.14. Find the fourth vertex of the parallelogram whose three vertices, taken in order are : $(a + b, a - b)$, $(2a + b, 2a - b)$, $(a - b, a + b)$
- Q.15. Solve the equation : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$
- Q.16. Prove that : $(\sin \theta + \sec \theta)^2 + (\cos \theta + \operatorname{cosec} \theta)^2 = (1 + \sec \theta \operatorname{cosec} \theta)^2$
- Q.17. Solve the following system of equations graphically : $2x - 3y - 6 = 0$; $2x + y + 10 = 0$ Determine the vertices of the triangle formed by the lines, representing the above equations and x-axis.
- Q.18. If the arithmetic mean of a and b is $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$, find the value of n
- Q.19. The angle of elevation of the top of a tower as observed from a point on the ground is α and moving 'a' meters towards the tower, the angle of elevation is β . Prove that the height of the tower is
$$\frac{a \tan \alpha \tan \beta}{\tan \beta - \tan \alpha}$$
- Q.20. A bucket made up of a metal sheet is in the form of a frustum of a cone of height 21 cm with radii of its lower and upper ends as 5 cm and 25 cm respectively. Find the cost of the bucket if the cost of the metal sheet used is Rs.15 per 100 cm^2 . ($\pi = 3.14$)

Q.21. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

Q.22. The weights in Kg of 50 wrestlers are recorded in the following table :

Weight (in kg)	100 – 110	110 – 120	120 – 130	130 – 140	140 – 150
Number of wrestlers	4	14	21	8	3

Find the mean height of the wrestlers

SECTION – D

Q.23. A point O in the interior of a rectangle ABCD is joined with each of the vertices A, B, C, D. Prove that $OB^2 + OD^2 = OC^2 + OA^2$

Q.24. A solid metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained is drawn into a wire of diameter $\frac{1}{12}$ cm, find the length of the wire.

Q.25. A train travels 180 km at a uniform speed. If the speed had been 9 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

Q.26. Construct a ΔABC with side $BC = 5$ cm, $AB = 6$ cm and $AC = 7$ cm. Construct $\Delta A'B'C'$ similar to ΔABC , each of whose sides are $\frac{7}{5}$ times the corresponding sides of ΔABC .

Q.27. The 9th term of a A.P. is equal to 6 times its second term. If the fifth term is 22, find the A.P.

Q.28. A and B each have certain number of oranges. A says to B “If you give me 10 of your oranges, I will have double the number of oranges left with you.” B replies “If you give 10 of your oranges, I will have the same number of oranges as left with you.” Find the number of oranges with A and B separately.

Q.29. If $x = a(1 + \cos\theta\cos\phi)$, $y = b(1 + \cos\theta\sin\phi)$ and $z = c(1 + \sin\theta)$, then prove that :

$$\left(\frac{x-a}{a}\right)^2 + \left(\frac{y-b}{b}\right)^2 + \left(\frac{z-c}{c}\right)^2 = 1$$

Q.30. Draw a ‘less than’ and ‘more than’ ogives and show median on graph.

Daily wages (in Rs.)	Number of workers
0 – 10	3
10 – 20	9
20 – 30	15
30 – 40	30
40 – 50	18
50 – 60	5

ANSWERS:

- | | | | | |
|------------|------------------|------------------------|-------------------------------|----------------------|
| 1) 3 | 6) $\frac{2}{9}$ | 11) 56 cm | 17) (-5, 0), (-3, -4), (3, 0) | 24) 4480 m |
| 3) $k = 3$ | 7) $y = x$ | 13) 3, 5, 7 | 18) $n = 1$ | 25) 36 km / h |
| 4) 8 cm | 8) 4.6 cm | 14) (-b, b) | 20) Rs.421.50 | 27) 2, 7, 12, 17 |
| 5) 2 | 10) 1 : 4 | 15) $-a, -\frac{b}{2}$ | 22) 123.4 kg | 28) A = 70
B = 50 |