

GRAND TEST – 3 :FULL SYLLABUS MATHS

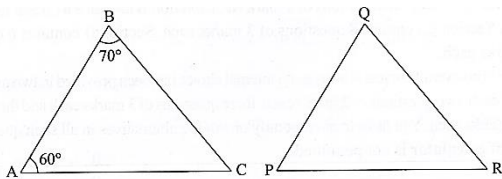
General Instructions:

- All questions are compulsory. Maximum Marks are 80.
- The question paper consists of 27 questions divided into four sections A, B, C and D.
- Section A comprises of **20 questions** of **1 mark** each.
- Section B comprises of **6 questions** of **2 marks** each.
- Section C comprises of **8 questions** of **3 marks** each.
- Section D comprises of **6 questions** of **4 marks** each.

Q1-10 are multiple choice questions. Select the most appropriate answer from the given options.

SECTION – A

1. Which of the following cannot be the general term of an A.P.?
 (a) $4n + 3$ (b) $3n^2 + 5$ (c) $\frac{2n-4}{5}$ (d) $n + 2$
2. The ordinate of a point A on the y-axis is 5 and B has coordinates (-3,1), then the length of AB is
 (a) 2 units (b) 5 units (c) 4 units (d) 3 units
3. If $\frac{6}{5}$, a, 4 are in A.P., the value of a is:
 (a) 1 (b) 13 (c) $\frac{13}{5}$ (d) $\frac{26}{5}$
4. If in the following figures, $\Delta ABC \sim \Delta QPR$, then the measure of $\angle Q$ is:
 (a) 60° (b) 90° (c) 70° (d) 50°



5. The perimeter of the sector with radius 10.5cm and sector angle 60° is:
 (a) 11cm (b) 23cm (c) 32cm (d) 41cm
6. If the base radius of a right circular cylinder is reduced to half and its height remains the same, then the ratio of the volume of new formed cylinder to original cylinder would be:
 (a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1
7. If each edge of a cube is increased by 50%. The percentage increase in the surface area is:
 (a) 125% (b) 75% (c) 50% (d) 25%
8. ‘Less than type’ ogive and ‘More than type’ ogive of a grouped of cumulative frequency distribution intersect at (140,70). The median of the distribution is:
 (a) 70 (b) 105 (c) 140 (d) 210

9. The sum of the lower limits of the median class and the modal class is:

Class	f	C.f.
0 – 5	10	10
5 – 10	15	25
10 – 15	12	37
15 – 20	20	57
20 – 25	9	66

- (a) 15 (b) 25 (c) 30 (d) 35

10. Two coins are tossed simultaneously. The probability of getting at most one Head is:"

- (a) $\frac{1}{2}$ (b) 1 (c) $\frac{1}{4}$ (d) $\frac{3}{4}$

Q11 -15: Fill in blanks

- A natural number when increased by 12 equals 160 times its reciprocal. The number is
- The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has real roots.
- The sum and product of zeroes of the quadratic polynomial $ax^2 + bx + c$ respectively are and
- The father's age is six times his son's age, four years hence, the age of the father will be four times, his son's age. The present ages, in years, of the son and the father are, respectively and
- The values of k for which the quadratic equation $kx^2 - 5x + k = 0$ has real and equal roots are

Q16 – 20: Answer the following:

- Two lines is given to be parallel. The equation of one of the lines is $4x + 3y = 14$. Check whether the equation of the second lines can be $-12x = 9y$.
- Write the decimal expansion of $\frac{27}{1250}$ without actual division
- If $x = \sqrt{2}$ is a solution of $kx^2 + \sqrt{2}x - 4 = 0$, then find the value of k.
- ΔABC is an isosceles triangle with $AC = BC$. If $AB^2 = 2AC^2$, prove that ΔABC is a right triangle.
- If $\sin \theta = \frac{a}{b}$, then $\cos \theta = ?$

SECTION – B:

- A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.
- Show that one and only one out of $n, n + 2, n + 4$ is divisible by 3, where n is any positive integer.
- If the pair of linear equations given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ represents parallel lines then find the value of k.

OR

If the pair of equations $x \sin \theta + y \cos \theta = 1$ and $x + y = \sqrt{2}$ has infinitely many solutions, then what is the value of θ ?

- If $(1, \frac{p}{3})$ is the mid-point of the line segment joining the points $(2,0)$ and $(0, \frac{2}{9})$, then show that the line $5x + 3y + 2 = 0$ passes through the point $(-1, 3p)$.
- If the HCF of 65 and 117 is in the form $(65m - 117)$, then find the value of m.
- A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that the card drawn is
 - a king or a jack
 - neither a king or a queen.

SECTION – C

27. Which term of A.P 3, 8, 13 is 78?

OR

In an AP, the first term is -4 , the last term is 29 and the sum of all its terms is 50 . Find its common difference.

28. Verify that $3, -1$ and $\frac{-1}{3}$ are the zeros of the cubic polynomial $P(x) = 3x^3 - 5x^2 - 11x - 3$, and verify the relationship between its zeros and coefficient.

29. If the point $P(x,y)$ is equidistant from the points $A(5,1)$ and $B(-1, 5)$, prove that $3x = 2y$.

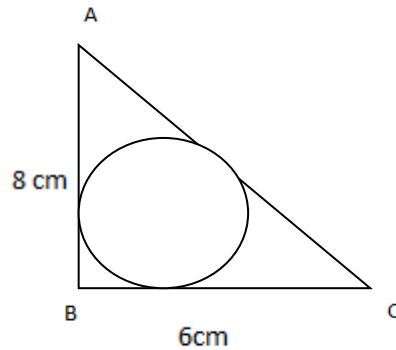
OR

Prove that the points $A(a,0)$, $B(0,b)$ and $C(1, 1)$ are collinear, if $\frac{1}{a} + \frac{1}{b} = 1$.

30. Construct a ΔABC in which $AB = 4\text{cm}$, $\angle B = 60^\circ$ and altitude $CL = 3\text{ cm}$. Construct a ΔADE is $\frac{3}{2}$ times that of the corresponding side of ΔABC .

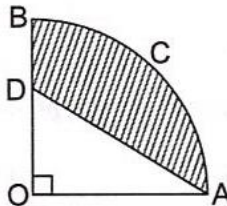
31. Prove that the parallelogram circumscribing a circle is a rhombus.

32. In the given figure, ΔABC is right angled at A , with $AB = 6\text{ cm}$ and $AC = 8\text{ cm}$. A circle with centre O has been inscribed inside the triangle. Find the value of r , the radius of the inscribed circle.



33. Prove that $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$.

34. In the figure, $OACB$ is a quadrant of a circle with centre O and radius 3.5 cm . If $OD = 2\text{ cm}$ find the area of the shaded region.



SECTION – D

35. If the roots of the equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $b + c = 2a$.

OR

The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$. Find the numbers.

36. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Using this if the areas of two similar triangles are in the ratio 25: 64, find the ratio of their corresponding sides.
37. A man on the deck of a ship 14 m above water level observes that the angle of elevation of the top of the cliff is 60° and the angle of depression of the base of cliff is 30° . Calculate the distance of the cliff from the ship and height of the cliff.

OR

The angles of depression of the top and bottom of a 50 m height building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (use $\sqrt{3} = 1.73$)

38. The following table gives the daily income of 50 workers of age less than 14 years. Draw both types (“less than type” and “more than type”) ogives and determine the median of the data.

Daily income (in ₹)	No. of Workers Less than 14 years
100-120	12
120-140	14
140-160	8
160-180	6
180-200	10

39. If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$
40. A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is $\frac{8}{9}$ of the curved surface of the whole cone, find the ratio of the line segment into which the altitude of the cone is divided by the plane.