V10M

Virudhunagar District

Common Quarterly Examination - September 2025

Standard 10

MATHEMATICS

Time: 3.00 Hrs. Marks: 100

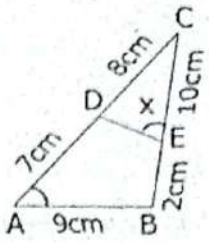
I. Choose the best answer: **14×1=14**

1) If $n(A \times B) = 6$ and $A = \{1, 3\}$ then $n(B)$ is
   a) 1 b) 2 c) 3 d) 6
2) If $f(x) = x^m$ and $g(x) = x^n$ does fog = ?
   a) x^m b) x^{m+n} c) x^{mn} d) x^n
3) Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible reminders are
   a) 0, 1, 8 b) 1, 4, 8 c) 0, 1, 3 d) 1, 3, 5
4) The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   a) 2025 b) 5220 c) 5025 d) 2520
5) The value of $(1^3+2^3+3^3+.....+15^3) - (1+2+3+.....+15)$ is
   a) 14400 b) 14200 c) 14280 d) 14520
6) Which of the following should be added to make x^4+64 a perfect square?
   a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$
7) Graph of a linear equation is a _____.
   a) Straight line b) Circle c) Parabola d) None of these
8) What is the value of x in $3\sqrt{x} = 9$?
   a) 3 b) 9 c) $\sqrt{9}$ d) $\sqrt{3}$
9) If ΔABC, is an isosceles triangle with $\angle C = 90^\circ$ and AC = 5 cm, then AB is
   a) 2.5 cm b) 5 cm c) 10 cm d) $5\sqrt{2}$ cm
10) If in ΔABC, DE || BC. AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is
   a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm
11) The slope of the line which is perpendicular to a line joining the points (0, 0) and (−8, 8) is
   a) −1 b) 1 c) 1/3 d) −8
12) The point of intersection of $x-y = 4$ and $x+y = 8$ is
   a) (2, 6) b) (1, 3) c) (6, 2) d) (4, 8)
13) $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
   a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$
14) When will the values of $\sin\theta$ and $\cos\theta$ be equal?
   a) $\theta = 0^\circ$ b) $\theta = 90^\circ$ c) $\theta = 30^\circ$ d) $\theta = 45^\circ$

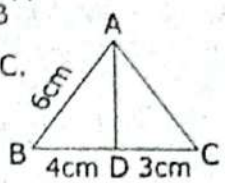
II. Answer any 10 questions: [Q.No. 28 is compulsory] **10×2=20**

15) If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ find A and B.
16) A relation $f : X \to Y$ is defined by $f(x) = x^2-2$ where, $X = \{-2, -1, 0, 3\}$ and Y = R.
   i) List the element of f. ii) Is f a function?
17) Let f be a function from R to R defined by $f(x) = 3x-5$, find the values of a and b given that (a, 4) and (1, b) belong to f.
18) Find the 4 digit pin number 'pqrs' of an ATM card such that $p^2 \times q^1 \times r^4 \times s^3 = 3,15,000$.
19) Find the 8th term of the G.P. 9, 3, 1,.....
20) Solve: $2x-3y = 6$, $x+y = 1$.
21) Reduce the rational expressions to its lowest form : $\frac{x^2-1}{x^2+x}$
22) Determine the nature of roots for the following quadratic equations:
   $2x^2-x-10 = 0$
23) Prove the following identities: $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$

24) In figure $\angle A = \angle CED$. Prove that $\Delta CAB \sim \Delta CED$. Also find the value of x.



25) In the figure AD is the bisector of $\angle BAC$, if AB = 10 cm, AC = 14 cm and BC = 6 cm. Find BD and AC.



26) Find the slope of a line joining the points $\left(5, \sqrt{5}\right)$ with the origin.

27) Find the equation of a line passing through the point (3, −4) and having slope $\frac{-5}{7}$.

28) Show that the straight lines $2x+3y-8 = 0$ and $4x+6y+18 = 0$ are parallel.

III. Answer any 10 questions: [Q.No. 42 is compulsory] **10×5=50**

29) A function is defined by $f(x) = 2x-3$

(i) find $\frac{f(0)+f(1)}{2}$ (ii) find x such that $f(x) = 0$

(iii) find x such that $f(x) = x$ (iv) find x such that $f(x) = f(1-x)$

30) Let $f : A \to B$ be a function defined by $f(x) = \frac{x}{2} - 1$, where A = {2, 4, 6, 10, 12}, B = {0, 1, 2, 4, 5, 9}. Represent f by (i) set of ordered pairs (ii) a table (iii) an arrow diagram (iv) a graph.

31) If $f(x) = 3x-2$, $g(x) = 2x+k$ and if fog = gof, then find the value of k.

32) How many terms of the series 1+5+9+..... must be taken so that their sum is 190?

33) Find the sum to n terms of the series 3+33+333+..... to n terms.

34) Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ... 24 cm. How much area can be decorated with these colour papers?

35) Solve: $6x+2y-5z = 13$, $3x+3y-2z = 13$, $7x+5y-3z = 26$.

36) Find the square root of $64x^4-16x^3+17x^2-2x+1$.

37) If one root of the equation $2y^2-ay+64 = 0$ is twice the other then find the values of a.

38) State and prove - Angle Bisector Theorem.

39) Find the area of the quadrilateral whose vertices are at (−3, −8), (6, −6), (4, 2) and (−8, 2).

40) If the points A(2, 2), B(−2, −3), C(1, −3) and D(x, y) form a parallelogram then find the value of x and y.

41) Find the equation of a straight line passing through the points P(−5, 2) and parallel to the line joining the points Q(3, −2) and R(−5, 4).

42) If $\sin\theta+\cos\theta = \sqrt{3}$ then prove $\tan 3\theta = \frac{3\tan\theta - \tan^3\theta}{1-3\tan^2\theta}$.

IV. Answer the following: **2×8=16**

43) Draw a triangle ABC of base BC = 8 cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that BD = 6 cm.

(OR)

Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3} > 1$).

44) Draw the graph of xy = 24, x, y > 0. Using the graph find, (i) y when x = 3 and (ii) x when y = 6.

(OR)

A bus is travelling at a uniform speed 50 km/hr. Draw the time-distance graph and hence find

i) the constant of variation ii) how far will it travel in 90 minutes?

iii) the time required to cover a distance of 300 km from the graph.
