GRAND TEST – 2 : Real Numbers, Polynomials, Pair of Linear Equations, Quadratic equations, AP, Triangles, Co-ordinate Geometry, Constructions.

General Instructions:
- All questions are compulsory. Maximum Marks are 60.
- The question paper consists of 27 questions divided into four sections A, B, C and D.
  - Section A comprises of **10 questions** of **1 mark** each.
  - Section B comprises of **6 questions** of **2 marks** each.
  - Section C comprises of **6 questions** of **3 marks** each.
  - Section D comprises of **5 questions** of **4 marks** each.

SECTION – A

1. The point which divides the line segment joining the points (8,-9) and (2,3) in ratio 1 : 2 internally lies in the:
   (a) I quadrant   (b) II quadrant   (c) III quadrant   (d) IV quadrant

2. Given that HCF (2520, 6600) = 120, LCM (2520, 6600) = 252 × k, then the value of k is:
   (a) 550   (b) 600   (c) 165   (d) 1625

3. Next term of the AP $\sqrt{3}$, $\sqrt{12}$, $\sqrt{27}$,…., is …….. .

4. In the given figure, if PL || QN and PM || QR, then $\frac{OM}{MR}$ = …….. .
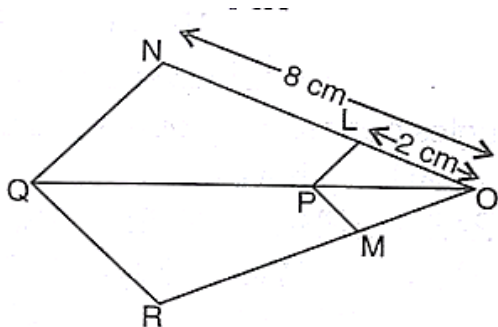

5. If 47 x + 31 = 18 and 31x + 47y = 60, then find the value of x + y.

6. For what value of k, will the lines represented by the following pair of linear equations has **infinitely many solutions:**   2x + 3y = 5 and 4x + ky = 10
   (a) 1   (b) $\frac{1}{2}$ (c) 3   (d) 6

7. Value of k for which points (7, -2), (5, 1), (3, k) are **collinear,** is:
   (a) 4   (b) 10   (c) -7   (d) -5

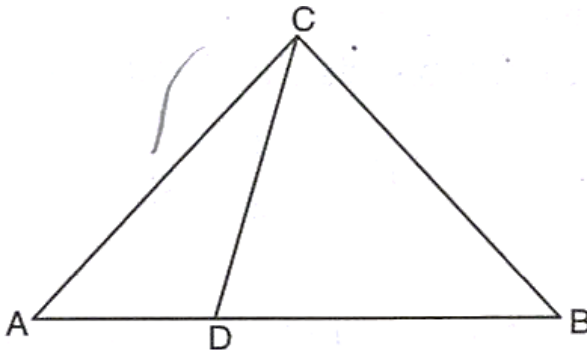8. The graph of a polynomial y = f(x) is shown in the figure. The number of zeros of f(x) is ………….
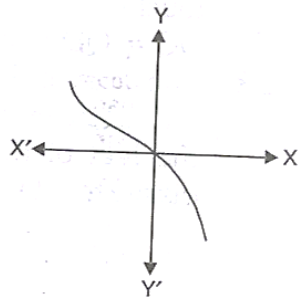
9. In the given figure, the value of x is ……..
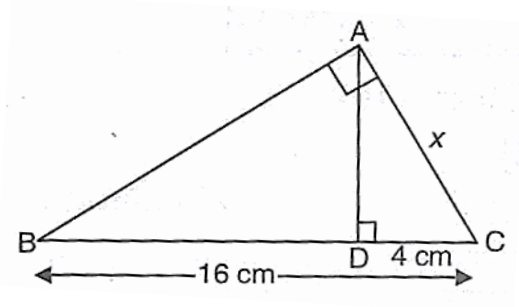
10. Find the product of HCF and LCM of the number 100 and 190.

SECTION – B :

11. In the given figure, if ∠ACB = ∠CDA, AC = 6 cm and AD = 3 cm, then find the length of AB.

12. How many terms of the AP 18, 16, 14, … be taken so that their sum is zero?

13. Find the number of natural numbers between 102 and 998 which are divisible by 2 and 5 both.

14. Find the greatest number that will divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.

OR

A merchant has 120 litres of oil one type, 180 litres of another type and 240 litres of third type. He wants to sell the oil by filing the three type of oil in tins of equal capacity. What should be the greatest capacity of such a tin?

15. Find the nature of the roots of the quadratic equation $2x^2 - 2\sqrt{6x} + 3 = 0$, if the real roots exist, then find them.

16. Two isosceles triangle have equal bases and their areas are in the ratio 16 : 49. Find the ratio of their corresponding altitudes.

SECTION – C

17. In the given figure, DEFG is a square and $\angle BAC = 90^0$. Show that $FG^2 = BG \times FC$.
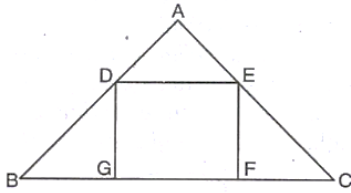
OR

In an equilateral triangle, prove that three times the square of one side is equal to four times the square of one its altitudes.

18. A motor boat whose speed in still water is 5 km/h, takes 1 hour more to go 12 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

A shopkeeper buys some books for Rs 80. If he had bought 4 more books for the same amount, each book would have cost Rs 1 less. Find the number of books he bought.

19. Use Euclid's Division Lemma to show that the square of any positive integer is either of the form 3n or 3n + 1 for some integer n.
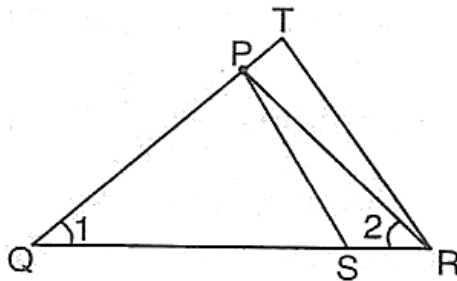
OR

Prove that $\sqrt{5}$ is irrational.

20. In the given figure, the line segment PQ is parallel to AC of ∆ABC and it divides the triangle into two parts of equal area. Find the ratio $\frac{AP}{AB}$.
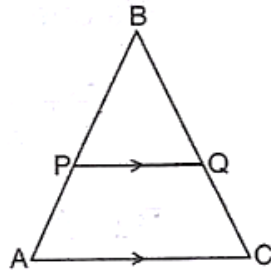
21. In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\Delta\ PQS \sim \Delta TQR$.

OR

For which values of a p and q will the following system of linear equations have infinity many solutions?

$4x + 5y = 2$

$(2p + 7q)x + (p + 8q)y = 2q - p + 1$

22. If the sum and product of the zeros of the polynomial $ax^2 - 5x + c$ are equal to 10 each, find the value of 'a' and 'c'.

OR

If $\propto$ and β are the zeroes of a quadratic polynomial such that $\propto + \beta = 0$ and $\propto - \beta = 8$. Find the quadratic polynomial having $\propto$ and β as its zeros.

SECTION – D

23. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

24. Draw an isosceles ΔABC in which BC = 5.5 cm and altitude AL = 3 cm. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of ΔABC.

OR

Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and $\angle B = 90^0$. BD is the perpendicular from B on AC. The circle through B, C, D is down. Construct the tangents from A to this circle.

25. Solve the following pair of equations: $\frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$; $\frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = \frac{1}{8}$

OR

A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30 km upstream and 21 km downstream in $6\frac{1}{2}$ hours. Find the speed of boat in still water and also speed of the stream.

26. Solve the following equation for x:
$9x^2 - 9(a + b) x + 2a^2 + 5ab + 2b^2 = 0$

OR

Two water taps together can fill a tan in $11\frac{1}{9}$ hours. The tap of smaller diameter takes 5 hours more than the larger one to fill the tank separately. Find the time in which each tap can separately fill the tank.

27. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

OR

The time taken by a person to cover 150 km was $2\frac{1}{2}$ hours more than the time taken in the return journey. If he returned a speed of 10km/hour more than the speed while going, find the speed per hours each direction.