

**Syllabus: Number systems, Polynomials, Coordinate Geometry, Euclid's Geometry, Triangles, Lines and Angles, Heron's Formula**

**GENERAL INSTRUCTIONS:**

- All questions are compulsory.
- The question paper is divided into four sections A, B, C, D
- Section A contains 8 questions of 1 mark each, Section B: 6 questions of 2 marks each, Section C has 10 questions of 3 marks each and Section D contains 10 questions of 4 marks each.
- Use of calculators is not allowed.

**Section A**

Q1. A point is at a distance of 4 units above the x-axis and 3 units to the left of the y-axis. Which of these could be its co-ordinates?

- (a) (3, 4)            (b) (-3, 4)            (c) (4, -3)            (d) (4, 3)

Q2 If  $P(x) = x^2 - 2\sqrt{2}x + 1$  then  $P(2\sqrt{2})$  is equal to:

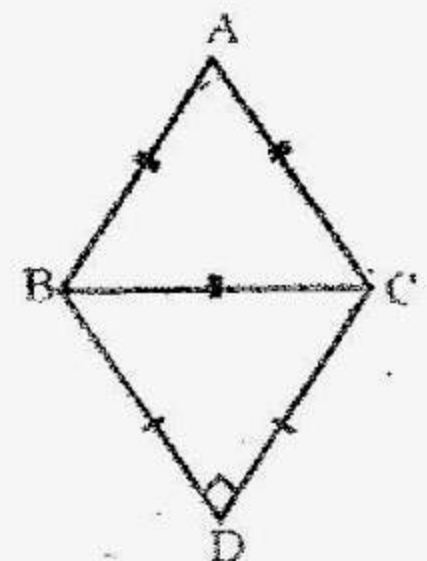
- (a) 0                            (b) 1                            (c)  $4\sqrt{2}$                             (d)  $8\sqrt{2} + 1$

Q3 The area of an equilateral triangle is  $16\sqrt{3} \text{ cm}^2$  then its perimeter is :

- (a) 48 cm                            (b) 24 cm                            (c) 12 cm                            (d) 306 cm

Q4 In the given figure ABC is an equilateral triangle and BDC is an isosceles right triangle, right angled at D.  $\angle ABD$  equals :

- (a)  $45^\circ$                             (b)  $60^\circ$                             (c)  $105^\circ$                             (d)  $120^\circ$



SECTION B

Q5. If  $x = 7 + \sqrt{40}$ , find the value of  $\sqrt{x} + \frac{1}{\sqrt{x}}$

Q6. Evaluate the products without multiplying directly:

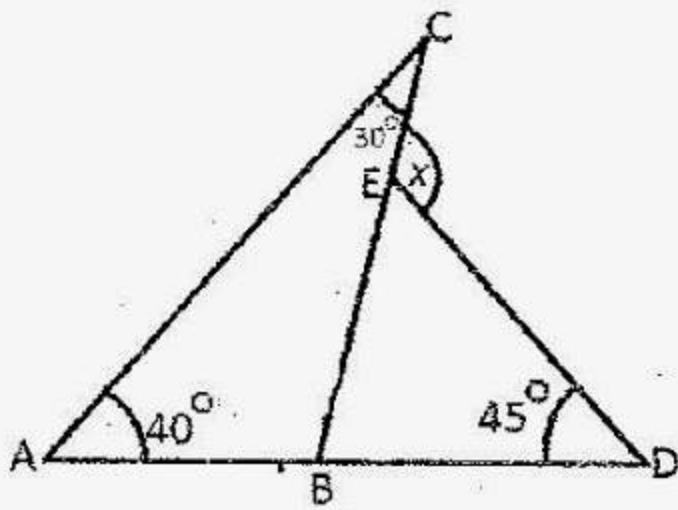
a)  $103 \times 107$     | (02)

b)  $(25)^3 - (75)^3 + (50)^3$

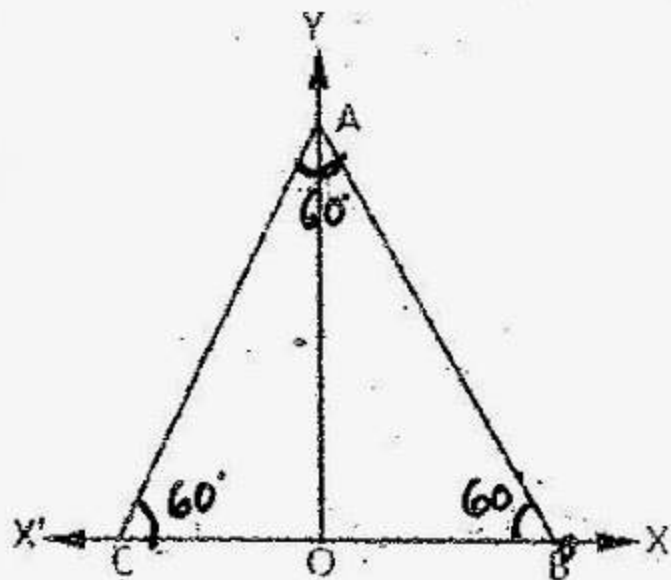
Q7. Find the value of  $a$  for which  $(x - 1)$  is factor of the polynomial  $a^2x^3 - 4ax + 4a - 1$ .

Q8. Represent  $0.\overline{36}$  in the simplest form of a rational number.

Q9. In the given figure find the value of  $x$



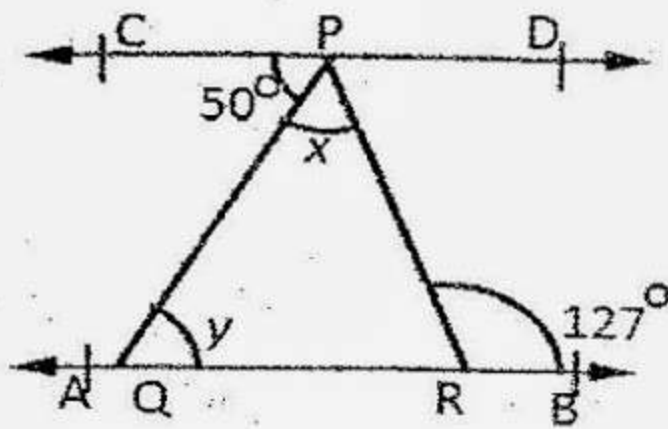
Q10. In the given figure, ABC is an equilateral triangle. The coordinates of vertex B are (3,0). Find the coordinates of vertices A and C.



SECTION C

Q11 Simplify the following:  $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}}$

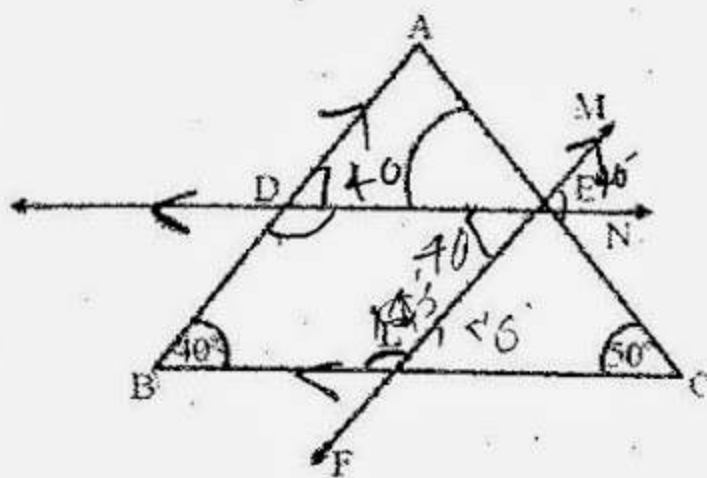
In the given figure, if  $AB \parallel CD$ ,  $\angle APQ = 50^\circ$  and  $\angle PRD = 127^\circ$ , find  $x$  and  $y$ .



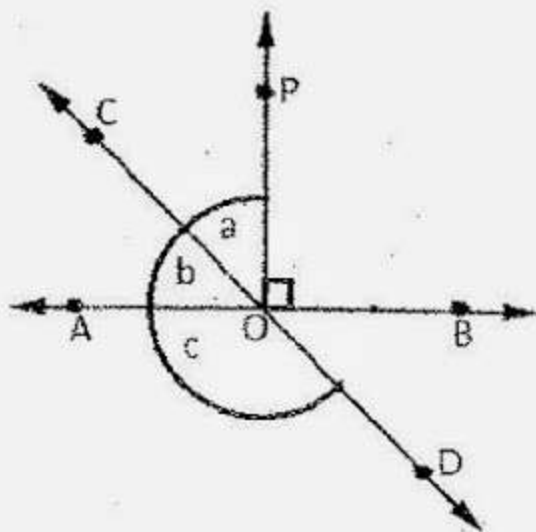
Q13 Determine the value of  $x^3 - 8y^3 - 36xy - 216$ , given that  $x - 2y = 6$ .

Q14 If  $(x - 2)$  and  $(x - \frac{1}{2})$  are factors of  $px^2 - 5x + r$ . Show that  $p = r$ .

Q15 In the given figure  $DE \parallel BC$  and  $MF \parallel AB$ . Find (i)  $\angle ADE + \angle MEN$  (ii)  $\angle BDE$  (iii)  $\angle BLE$ .



Q16 Lines AB and CD intersect at O. If  $\angle POB = 90^\circ$  and  $a : b = 2 : 3$ , find  $c$ .



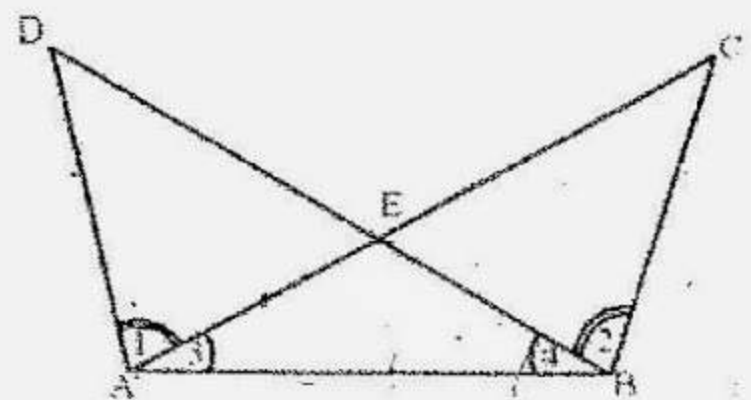
Q17. Factorise the following:

a)  $\sqrt{2}x^2 + 3x + \sqrt{2}$

b)  $8x^3 + y^3 + 27z^3 - 18xyz$ .

Q18. In the given figure,  $\triangle ABC$  and  $\triangle ABD$  are such that  $AD = BC$ ,  $\angle 1 = \angle 2$  and  $\angle 3 = \angle 4$ .

Prove that  $BD = AC$ .



Q19 Prove that the bisectors of two adjacent supplementary angles form a right angle.

Q20 ABC is right triangle, right angled at B and  $\angle BCA = 2\angle BAC$ . Prove that  $AC = 2BC$ .

### SECTION D

Q21 On a graph paper plot the points A(3,3) and B(-2, -4) .

Identify and plot the mirror images of these points in i) x axis and ii) y axis

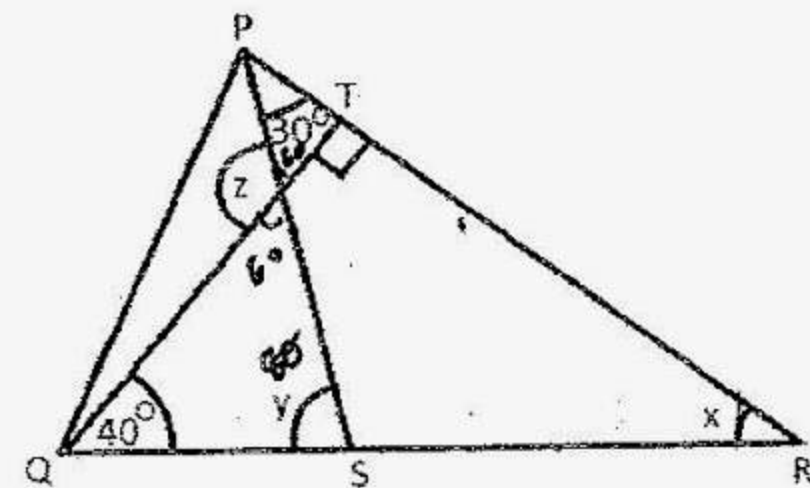
Q22. If the polynomial  $kx^3 + 3x^2 - 13$  and  $2x^3 - 5x + k$  when divided by  $x - 2$  leaves the same remainder. Find the value of  $k$ .

Q23 If  $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$  and  $y = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ , find  $x^2 + y^2$ .

Q24. Given that 2 and  $\left(\frac{-1}{3}\right)$  are the zeros of the polynomial  $3x^3 - 2x^2 - 7x - 2$ . Find the third zero of the polynomial.

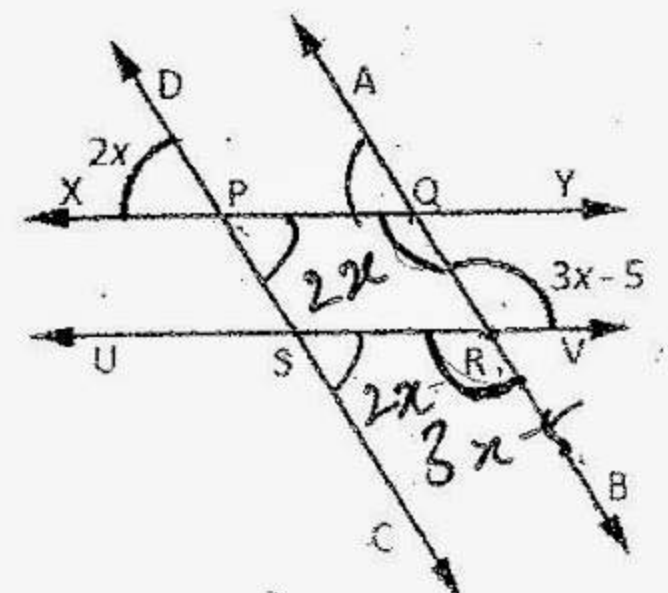
Q25 If  $ax^2 + 2a^2x + b^3$  is exactly divisible by  $(x + a)$ , prove that  $a = b$  or  $a^2 + ab + b^2 = 0$ .

Q26 In the given figure,  $QT \perp PR$ ,  $\angle TQR = 40^\circ$  and  $\angle SPR = 30^\circ$ . Find the values of  $x$ ,  $y$  and  $z$ .

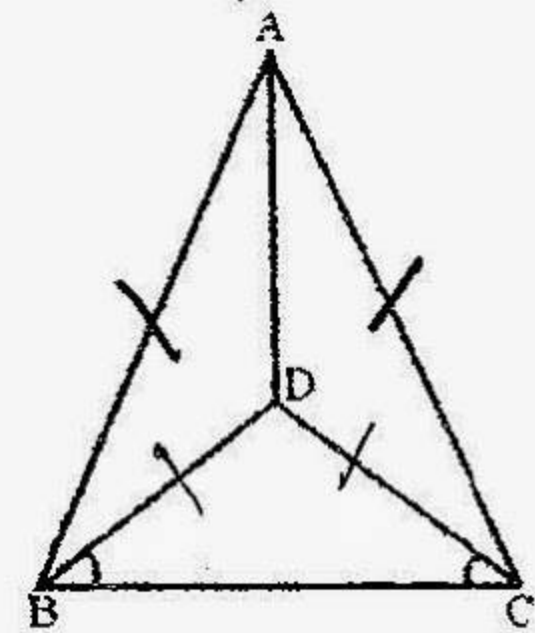


Q27 In the given figure  $XY \parallel UV$ . Find the values of  $x$  for which  $AB \parallel CD$ .

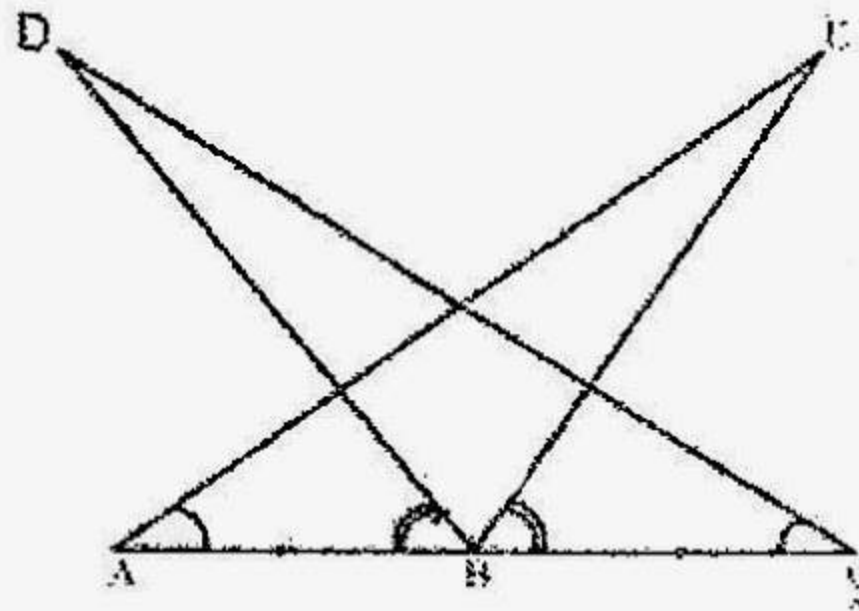
Also find  $\angle DPX$ ,  $\angle QRV$ ,  $\angle SRB$  and  $\angle PQR$ .



Q28 In the given figure,  $AB = AC$ ,  $D$  is a point of the interior of  $\Delta ABC$  such that  $\angle DBC = \angle DCB$ . Prove that  $AD$  bisects  $\angle BAC$  of  $\Delta ABC$ .



Q29 In the given figure,  $B$  is the mid point of  $AC$ ,  $\angle A = \angle C$  and  $\angle ABD = \angle CBE$ . Prove that  $CD = AE$ .



Q30. Without actual division show that  $(x^3 - 3x^2 - 13x + 15)$  is exactly divisible by  $(x^2 + 2x - 3)$ .

31. A triangular park in a school has dimensions 50 m, 45 m and 55 m. Find the cost of planting grass in the park at the rate of Rs. 4 per sq m. ( $\sqrt{2} = 1.41$ )

**What is the importance of greenery in our environment?**