

## General Instructions:

### Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This question paper is divided into 5 sections A, B, C, D and E.
3. In Section A, question numbers 1 to 18 are multiple choice questions (MCQs) and questions 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section B, question numbers 21 to 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, question numbers 26 to 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, question numbers 32 to 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, question numbers 36 to 38 are case study based questions carrying 4 marks each with sub part of the values 1, 1 and 2 marks each respectively.
8. All questions are compulsory. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take  $\pi = \frac{22}{7}$  wherever required if not stated.
11. Use of calculators is not allowed.

## Section A

**Section A consists of 20 questions of 1 mark each.**

1. The rational number  $0.\bar{3}$  can also be written as:

- a. 0.3            b.  $\frac{3}{10}$             c. 0.33            d.  $\frac{1}{3}$
2. If in  $\Delta PQR$ ,  $PQ = PR$ , then:  
 a.  $\angle P = \angle R$     b.  $\angle P = \angle Q$     c.  $\angle Q = \angle R$     d. none of these
3. The zero of the polynomial  $p(x) = 2x + 5$  is:  
 a. 2            b. 5            c.  $\frac{2}{5}$             d.  $-\frac{5}{2}$
4. If  $AB = x + 3$ ,  $BC = 2x$ ,  $AC = 4x - 5$ , then for what values of  $x$ , B lies on AC?  
 a. 2            b. 3            c. 5            d. 8
5.  $(-5 + 2\sqrt{5} - \sqrt{5})$  is:  
 a. an irrational number  
 b. a positive rational number  
 c. a negative rational number
6. Intersecting lines cut each other at:  
 a. one point  
 b. two points  
 c. three points  
 d. null
7. A rational number between  $\sqrt{2}$  and  $\sqrt{3}$  is:  
 a. 1.5            b. 1.8            c.  $\frac{\sqrt{2} \cdot \sqrt{3}}{2}$             d. 1.9
8. Two complementary angles are such that two times the measure of one is equal to three times the measure of the other. The measure of the smaller angle is:  
 a.  $30^\circ$             b.  $36^\circ$             c.  $45^\circ$             d. none of these
9. Which of the following cannot be the angles of a triangle?  
 a.  $30^\circ, 60^\circ, 90^\circ$   
 b.  $50^\circ, 60^\circ, 70^\circ$   
 c.  $40^\circ, 50^\circ, 100^\circ$   
 d.  $45^\circ, 45^\circ, 90^\circ$
10. Ordinate of all the points on the  $x$  - axis is:  
 a. 0            b. 1            c. -1            d. any natural number
11. Identify the polynomial:  
 a.  $x^2 + 5\sqrt{x} + 7$   
 b.  $x^{-2} + x^{-1} + 5$

c.  $3x^2 + 7$

d.  $\frac{1}{x^3} + 7$

12. Things which are double of the same thing are:

- a. equal
- b. unequal
- c. halves of the same thing
- d. double of the same thing

13. Points  $(1, -2)$ ,  $(1, -3)$ ,  $(-4, 5)$ ,  $(0, 0)$ :

- a. lie in III quadrant
- b. lie in II quadrant
- c. do not lie in same quadrant
- d. lie in IV quadrant

14. The number of dimensions, a solid has is:

- a. 1
- b. 2
- c. 3
- d. 0

15. The area of a triangle is  $150 \text{ cm}^2$  and its sides are in the ratio  $3 : 4 : 5$ . What is its perimeter?

- a. 10 cm
- b. 30 cm
- c. 45 cm
- d. 60 cm

16. In  $\triangle ABC$ , if  $BC = AB$  and  $\angle B = 80^\circ$ , then  $\angle A$  is equal to:

- a.  $80^\circ$
- b.  $40^\circ$
- c.  $50^\circ$
- d.  $100^\circ$

17. If  $x + 2$  is a factor of  $x^2 + mx + 14$ , then  $m =$

- a. 2
- b. 9
- c. 7
- d. 14

18. If the perimeter of an equilateral triangle is 60 cm, then what is its area?

- a.  $200\sqrt{2} \text{ cm}^2$
- b.  $100\sqrt{2} \text{ cm}^2$
- c.  $100\sqrt{3} \text{ cm}^2$
- d.  $200\sqrt{3} \text{ cm}^2$

Directions: In question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R).

Choose the correct option:

- a. Both assertion (A) and reason (R) are true, and reason (R) is the correct explanation of assertion (A).
- b. Both assertion (A) and reason (R) are true, and reason (R) is not the correct explanation of assertion (A).
- c. Assertion (A) is true, but reason (R) is false.
- d. Assertion (A) is false, but reason (R) is true.

19. Assertion (A): The point  $(0, 4)$  lies on  $y - axis$ .

Reason (R): The  $x - coordinate$  of the point on  $y - axis$  is zero.

20. Assertion (A): The side of an equilateral triangle is 6 cm, then the area of the triangle is  $9 \text{ cm}^2$ .

Reason (R): All the sides of an equilateral triangle are equal.

### Section – B

**Section B consists of 5 questions of 2 marks each.**

21. Using factor theorem, show that  $g(x)$  is a factor of  $p(x)$ , when  $p(x) = 2x^4 + 9x^3 + 6x^2 - 11x - 6$ ,  $g(x) = x - 1$ .

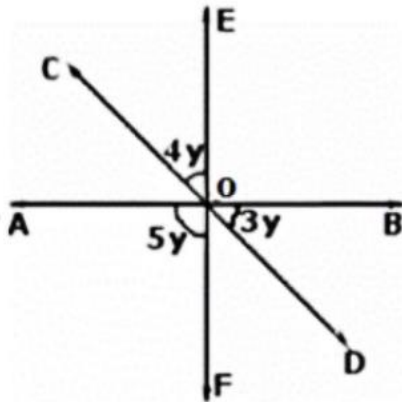
22. Simplify:  $\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left[\left(\frac{25}{9}\right)^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$

23. Factorise:  $a^3 - 2\sqrt{2}b^3$

**OR**

Factorise:  $x^4 + x^2y^2 + y^4$

24. In the given figure, determine the value of  $y$ .



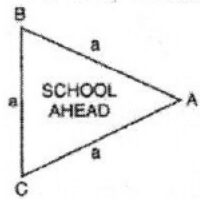
25. If a point C lies between two points A and B such that  $AC = BC$ , then prove that  $AC = \frac{1}{2} AB$ . Also draw a figure.

### Section – C

**Section C consists of 6 questions of 3 marks each.**

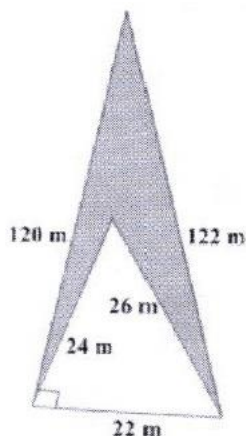
26. Factorise the polynomial  $25x^2 + 16y^2 - 4z^2 - 40xy + 16yz - 20xz$ .

27. A traffic signal board, indicating SCHOOL AHEAD is an equilateral triangle with side A. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?



**OR**

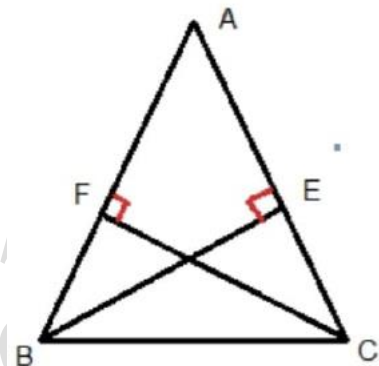
Calculate the area of the shaded region in the given figure.



28. Locate  $\sqrt{3}$  on the number line.

29. If two parallel lines are intersected by a transversal, then the bisectors of any two corresponding angles are parallel.

30. In the given figure, AD and BE are respectively altitudes of  $\Delta ABC$  such that  $AE = BD$ . Prove that  $AD = BE$ .

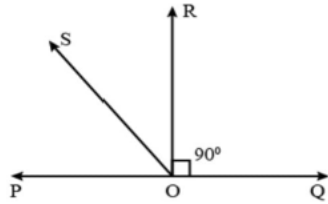


31. D and E are points on side BC of  $\Delta ABC$  such that  $BD = CE$  and  $AD = AE$ . Show that  $\Delta ABD \cong \Delta ACE$ .

### Section – D

**Section D consists of 4 questions of 5 marks each.**

32. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that  $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$ .

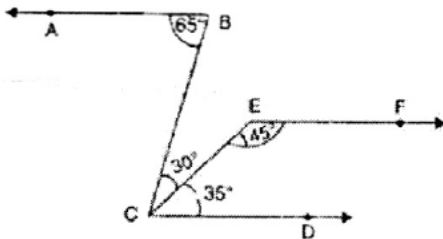


33. If  $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$  and  $b = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ , then find the value of  $a^2 + b^2$ .

**OR**

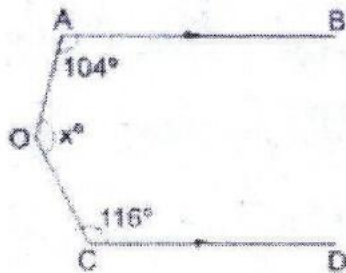
Find the value of  $a$  and  $b$ , if  $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a - b\sqrt{6}$ .

34. In the given figure,  $\angle ABC = 65^\circ$ ,  $\angle BCE = 30^\circ$ ,  $\angle DCE = 35^\circ$  and  $\angle CFE = 145^\circ$ . Prove that  $AB \parallel FE$ .



**OR**

In the given figure,  $AB \parallel CD$  and  $\angle AOC = x^\circ$ . If  $\angle OAB = 104^\circ$  and  $\angle OCD = 116^\circ$ , find the value of  $x$ .



35.a. If  $x + y = 12$  and  $xy = 27$ , find the value of  $x^3 + y^3$ .

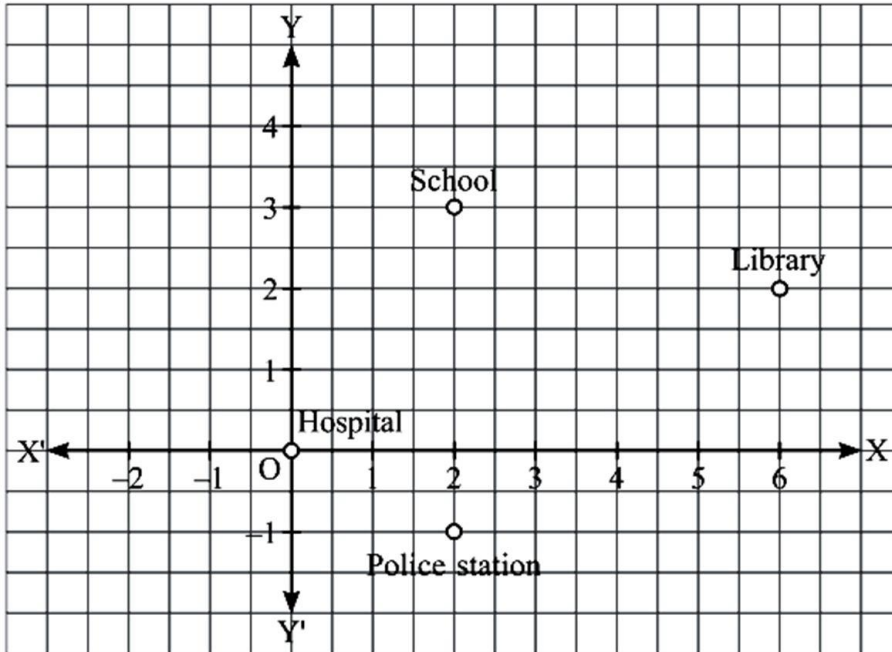
b. Without actually calculating the cubes, find the value of  $48^3 - 30^3 - 18^3$ .

### Section – E

**Section E consists of 3 case study based questions of 4 marks each.**

36. Aditya is a class IX student residing in a village. One day, he went to a city hospital along with his grandfather for general checkup. From there he visited three places – school, library and police station. After returning to his village, he plotted a graph by taking hospital as origin and marked three

places on the graph as per his direction of movement and distance. The graph is shown below.



- What are the coordinates of school?
- What are the coordinates of police station?
- What are the coordinates of library?

**OR**

What is the distance between the school and the police station?

37. Ankur and Ranjan start a new business together. The amount invested by both parties is given by the polynomial  $p(x) = 4x^2 + 12x + 5$ , which is the product of their individual shares.

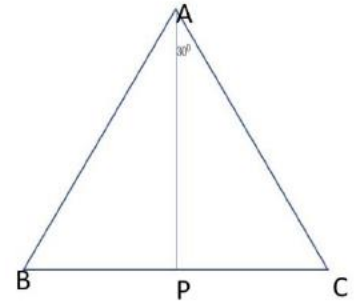
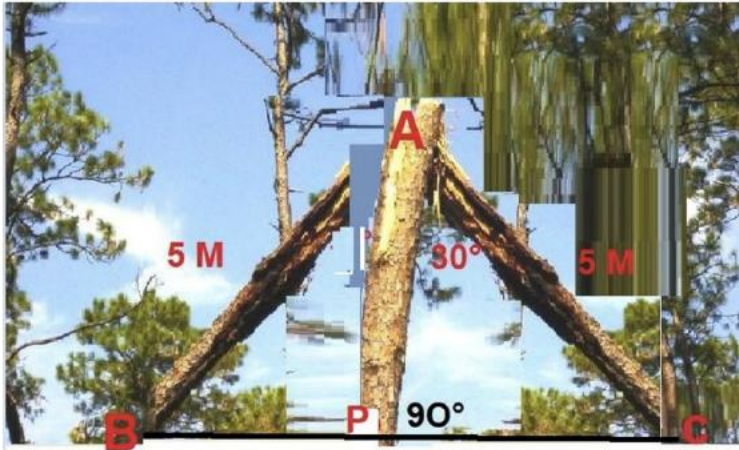
Answer the following questions:

- What is the name of the polynomial as per its degree?
- Find the total amount invested by both if  $x = 1000$ .
- What is the share of Ankur and Ranjan individually?

**OR**

How many countries are having child labour more than Mexico?

38. In a forest, a big tree got broken due to heavy rain and wind. Due to this rain the big branches AB and AC with lengths 5 m fell down on the ground. Branch AC makes an angle of  $30^\circ$  with the main tree AP. The distance of point B from P is 4 m.



- (i) Show that  $\triangle ACP \cong \triangle ABP$  are congruent.
- (ii) Find the value of  $\angle ACP$ .
- (iii) Find the value of  $\angle BAP$ .

**OR**

What is the total height of the tree?