

General Instructions:

1. This question paper has 5 sections A to E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (4 marks each) with sub – parts of the values 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

Section – A

1. The area of a triangle whose base and altitude are 5 cm and 4 cm respectively is:
a. 5 cm^2 b. 10 cm^2 c. 15 cm^2 d. 20 cm^2
2. If $(5, k)$ is a solution of the equation $2x + y - 7 = 0$, then the value of k is:
a. 5 b. 3 c. -3 d. -2
3. Decimal representation of a rational number cannot be:
a. terminating
b. non – terminating
c. non – terminating repeating
d. non – terminating non – repeating
4. In $\triangle ABC$, $BC = AB$ and $\angle B = 80^\circ$, then $\angle A$ is equal to:

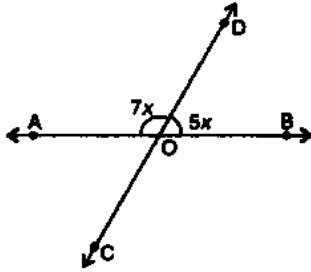
- a. 80° b. 40° c. 50° d. 100°
5. The linear equation $x - 2 = 3y + 7$ has:
- a. one solution
b. two solutions
c. infinite solutions
d. no solutions
6. The perpendicular distance of the point $P(4, 3)$ from $x - axis$ is:
- a. 4 b. 3 c. 0 d. both 4 and 3
7. The length of each side of an equilateral triangle of area $4\sqrt{3} \text{ cm}^2$ is:
- a. 4 cm b. 3 cm c. 1 cm d. $\sqrt{3}$ cm
8. Ordinate of all the points on the $x - axis$ is:
- a. 0 b. 1 c. any number d. -1
9. The coefficient of x^2 in the expansion of $(x + 3)^3$ is:
- a. 1 b. 9 c. 18 d. 27
10. Which of the following is a polynomial?
- a. $x^{-1} + 4$ b. $x^3 + x$ c. $x^3 + 2\sqrt{x} + 6$ d. $y^2 + \frac{1}{y} + 4$
11. The angles of a triangle are in the ratio $2 : 3 : 4$. The largest angle of the triangle is:
- a. 120° b. 100° c. 80° d. 60°
12. If $AB = QR$, $BC = RP$ and $CA = RP$, then $\Delta ABC \cong \Delta QRP$ by:
- a. SSS b. SAS c. ASA d. RHS
13. One of the solutions of the equation $3x - 5y = 15$ is:
- a. (1, 1) b. (1, 5) c. (5, 0) d. (3, 7)
14. The $\frac{p}{q}$ form of the number $0.\bar{2}$ is:
- a. $\frac{1}{5}$ b. $\frac{2}{9}$ c. $\frac{2}{5}$ d. $\frac{1}{8}$
15. Each of the points $(-2, 2)$, $(0, 0)$, $(2, -2)$ satisfies the linear equation:
- a. $x - y = 0$
b. $x + y = 0$
c. $-x + 2y = 0$
d. $x - 2y = 0$
16. Factors of $9x^2 - 16y^2$ are:
- a. $(3x + 4y)(3x - 4y)$
b. $(3x - 4y)(3x + 4y)$
c. $(9x + 4y)(9x - 4y)$

d. $(3x + 4y)(3x + 4y)$

17. If $(x + 1)$ is a factor of the polynomial $2x^2 + kx$, then the value of k will be:

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

18. In the given figure, the value of x is:



- a. 15° b. 13° c. 180° d. 12°

19. **Assertion (A):** If angles a and b form a linear pair of angles and $a = 40^\circ$ and $b = 150^\circ$.

Reason (R): Sum of linear pair of angles is always 180° .

20. **Assertion (A):** There are infinite number of lines which pass through $(2, 14)$.

Reason (R): A linear equation in two variables has infinitely many solutions.

Section – B

Section B consists of 5 questions of 2 marks each.

21. Write the expanded form of $(7a - 3b)^3$.

OR

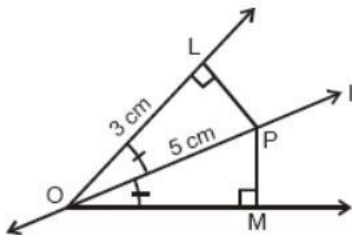
Factorise: $8x^3 - 27y^3$.

22. Without plotting the points, indicate the quadrant in which they lie, if:

- a. the ordinate is 5 and the abscissa is 3
b. the abscissa is (-5) and ordinate is 3.

23. Find the measure of an angle which is 26° more than its complement.

24. In the given figure, find the length of PM . (give reasons)



25. Find the possible expressions for the length and breadth of the rectangle whose area is given by $4a^2 + 4a - 3$.

OR

Using suitable identity, find the value of $(29)^3$.

Section – C

Section C consists of 6 questions of 3 marks each.

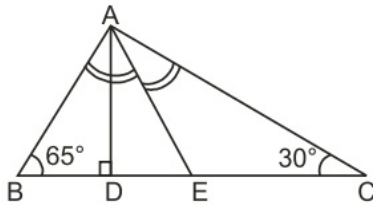
26. If $x = 2 + 3\sqrt{2}$, find the value of $x + \frac{14}{x}$.

27. Factorise the polynomial $64a^3 - 27b^3 - 144a^2b + 108ab^2$

OR

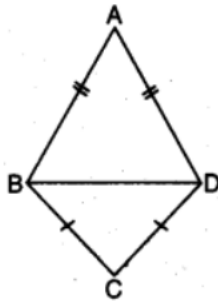
Factorise $x^3 + 3x^2 + 3x + 1$

28. In the given figure, AE is the bisector of $\angle A$, $AD \perp BC$. Find the value of $\angle EAD$.

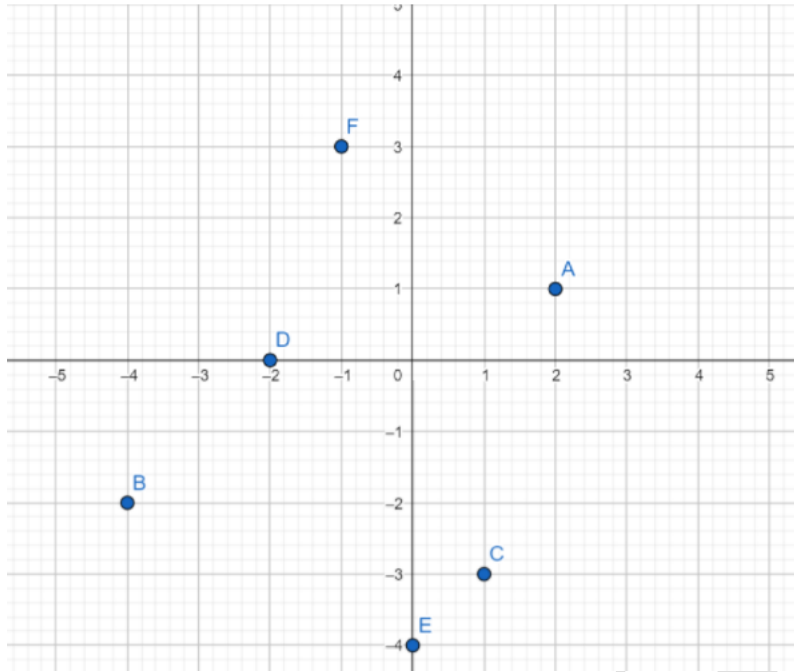


OR

In the given figure, $\triangle ABC$ and $\triangle BCD$ are isosceles triangles on the same base BD. Prove that $\angle ABC = \angle ADC$.



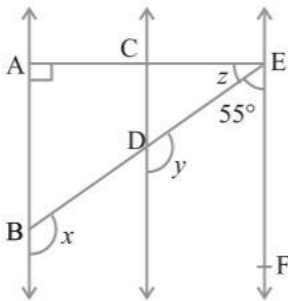
29. Using the given figure, answer the following questions:



- (i) Write the coordinates of A and E.
- (ii) The abscissa of point F.
- (iii) The ordinate of point D.

30. Find the area of an isosceles triangle whose one side is 10 cm greater than its each equal side and its perimeter is 100 cm.

31. In the given figure, $AB \parallel CD$ and $CD \parallel EF$. Also, $EA \perp AB$. If $\angle BEF = 55^\circ$, find the values of x , y and z . (give reasons)



Section – D

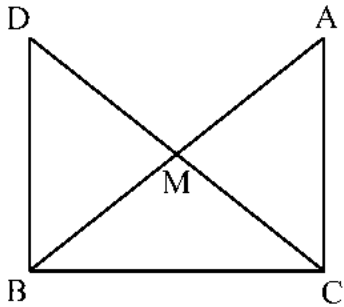
Section D consists of 4 questions of 5 marks each.

32. If $a = 8 + 3\sqrt{7}$ and $b = \frac{1}{a}$, then find the value of $a^2 + b^2$?

OR

Find the value of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by the polynomials $(x - 1)$ and $(x - 2)$.

33. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Aarushi paid ₹ 27 for a book kept for seven days. If fixed charges are ₹ x and per day charges are ₹ y , write a linear equation representing the above situation. Express the equation in the standard form of linear equation in two variables. Also, write the coefficient of a , b and c of the equation thus formed.
34. In a right triangle ABC, right angled at C, M is the mid – point of hypotenuse AB. C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to B. Show that:



- (i) $\triangle AMC \cong \triangle BMD$
(ii) $\angle DBC$ is a right angle
(iii) $\triangle DBC \cong \triangle ACB$
35. The sides of a triangular field are 51 m, 37 m and 20 m. Find the number of flower beds that can be prepared if each bed is to occupy 9 m^2 of space.

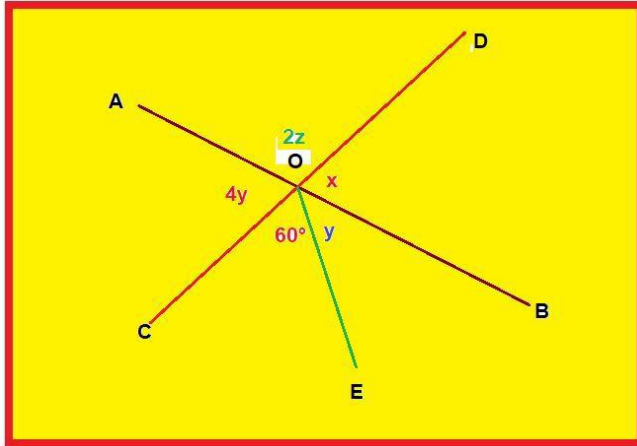
OR

The sides of a triangle are in the ratio 3 : 4 : 5 and its perimeter is 510 m. What is the measure of its greatest side?

Section – E

Case Study Questions

36. Class IX Mathematics teacher draws a straight line AOB on the board and instructed some students to add more lines as below.
- (i) Raju to draw another line CD as in the figure.
(ii) Ajay to mark $\angle AOD$ as $2z$.
(iii) Suraj was told to mark $\angle AOC$ as $4y$.
(iv) Manoj made $\angle COE = 60^\circ$.
(v) Priya marked $\angle BOE$ and $\angle BOD$ as y and x respectively.



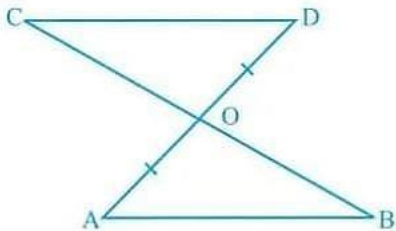
Based on the above information answer the following questions:

- (i) What is the measure of $\angle AOC$?
- (ii) What should be the value of $x + 2z$? Give reason.
- (iii) Find the values of x and y . Give reasons.

OR

What is the sum of the measures of $\angle BOD$ and $\angle BOE$? Give reasons.

37. While playing in a park, Neena drew two parallel lines AB and CD and joined them to get two triangles AOB and COD respectively such that O is the mid – point of AD (as shown in the figure). Her friend Meena joined her in the park and asked the following questions:

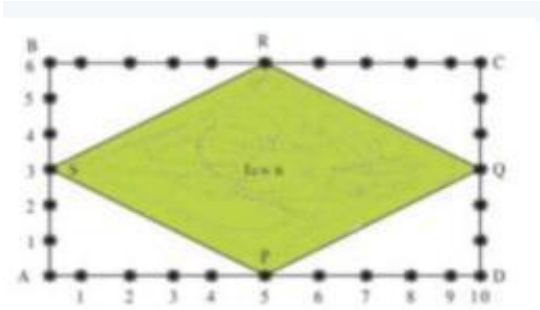


- (i) Is $\triangle AOB$ congruent to $\triangle COD$? Give reasons.
- (ii) Prove that $CO = BO$. Give reasons.
- (iii) Find AB , if $CD = 4$ cm, $OD = 3$ cm and $OC = 6$ cm. What is the mid – point of BC ?

OR

If $\angle A = 60^\circ$, $\angle B = 45^\circ$, then find the measure of $\angle COD$.

38. Students of class IX of a secondary school in Ludhiana have been allotted a rectangular plot of land for their gardening activity. Saplings of Gulmohar are planted on the boundary at 1 m from each other. There is a lawn PQRS in between the rectangular plot as shown in the figure.



Based on the above information, answer the following questions:

- (i) What are the coordinates of A, B, C and D taking A as origin?
- (ii) What are the coordinates of P, Q, R and S?
- (iii) Find the perimeter and area of the rectangular plot ABCD.

OR

Find the area of the lawn PQRS. Also find the area of the non – shaded region.