

MATHEMATICS

(POLYNOMIALS, Linear Equation in Two Variables, Co-Ordinate Geometry, Lines and Angles)

CLASS-IX

General instructions:

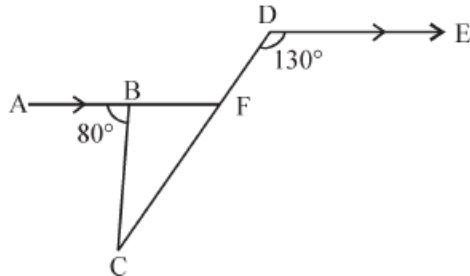
- (i) All the questions are compulsory.
- (ii) The question paper consists of 47 questions divided into 4 sections A, B, C, and D.
- (iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 9 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 10 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculators is not permitted.

SECTION-A

- 1) One of the factors of $(25x^2 - 1) + (1 + 5x)^2$ is:
(a) $5x + 1$ (b) $5 - x$ (c) $5x - 1$ (d) $10x$
- 2) P is a point on the x-axis at a distance of 8 units from the y-axis to its right. The co-ordinates of P are:
(a) (0, 8) (b) (8, 0) (c) (-8, 0) (d) (0, -8)
- 3) The graph of equation of the form $ax + by + c = 0$ where a, b and C are non-zero numbers, represents:
(a) a triangle (b) a ray
(c) a straight line (d) a line segment
- 4) The points (-5, 2) and (2, -5) lie in the:
(a) same quadrant (b) II and III quadrants, respectively
(c) II and IV quadrants, respectively (d) IV and II quadrants, respectively
- 5) If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 2: 3, then the greater of the two angles is:
(a) 54° (b) 108° (c) 120° (d) 136°

- 6) If degree of each of $f(x)$ and $[f(x)+g(x)]$ is 18, then find the range of degree of $g(x)$
- a) 18 b) ≥ 18 c) ≤ 18 d) can't say

- 7) In the figure, $AB \parallel DE$, the value of $\angle BCD$ is:



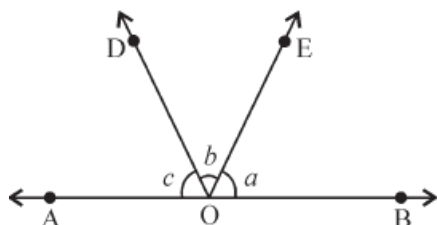
- (a) 80° (b) 130° (c) 50° (d) 30°
- 8) The coefficient of x^2 in $(2 - 3x^2)(x^2 - 5)$ is:
- (a) -17 (b) -10 (c) -3 (d) 17

- 9) If the measure of an angle is twice the measure of its supplementary angle, then the measure of the angle is:
- (a) 60° (b) 90° (c) 120° (d) 130°

- 10) The point whose ordinate is 4 and which lies on y-axis is:
- (a) (4, 0) (b) (0, 4) (c) (1, 4) (d) (4, 2)

- 11) The perpendicular distance of a point from the x-axis is 6 and that from y-axis is 2. What may be the co-ordinates of the point?

- 12) In the figure, $a : b : c = 4 : 3 : 5$. If AOB is a straight line, Find the value of a?



- 13) If $p(x) = 3x - 2$, find the value of $p(2) + p(-2)$
- 14) If $x+1$ is factor of $2x^2+kx$ then value of _____
- 15) The base BC of triangle ABC is produced both ways and the measures of exterior angles formed are 94 and 126. Then $\angle BAC$ _____

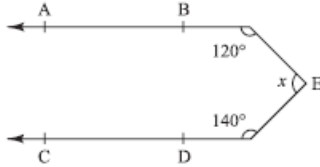
16) Write whether the following statements are true or false. Justify your answer.

(i) Point $(0, -2)$ lies on the y-axis.

17) If $a^2 + b^2 + c^2 = 250$ and $ab + bc + ca = 3$ find the value of $a + b + c$?

18) Factorise $27x^3 - 64y^3$

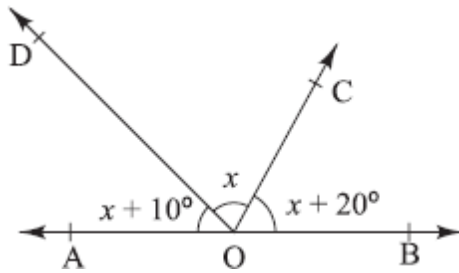
19) In the figure, AB and CD are parallel to each other. The value of x is:



20) Express the following equations $5x = -2y - 3$ in the form $ax + by + c = 0$ and indicate the values of a, b and c.

SECTION-B

21) Find value of $\angle AOD$ so that AOB is straight line



22) Factorise: $x^2 + 4y^2 + z^2 - 4xy + 4yz - 2zx$

23) Expand using suitable identity $\left[\frac{1}{3x} - \frac{2}{5y}\right]^3$

24) Write equation of line that is parallel to x-axis and passing through the points

a) $(0, 3)$

b) $(2, -5)$

(Or)

Write equation of line that is parallel to y-axis and passing through the points

a) $(-4, 0)$

b) $(3, 4)$

25) Write two solutions of the equations $3x + 4y = 7$

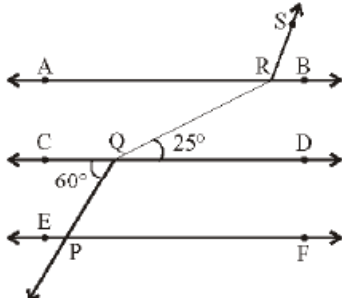
26) If $p = 2 - a$, prove that $a^3 + 6ap + p^3 - 8 = 0$.

27) Prove that sum of the angles triangles is 180.

(Or)

Prove that if two lines intersect then vertically opposite angles are equal”

28) In the figure if $AB \parallel CD \parallel EF$, $PQ \parallel RS$, $\angle RQD = 25^\circ$ and $\angle CQP = 60^\circ$, then Find $\angle QRS$



29) If a transversal intersects two lines such that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.

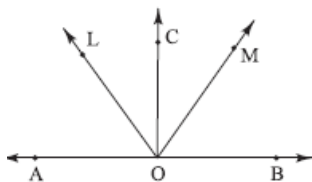
SECTION-C

30) If the point $(2k - 3, k + 2)$ lies on the graph of the equation $2x + 3y + 15 = 0$, find the value of k .

(Or)

For what value of k is $x = 2, y = 3$ a solution of $(k + 1)x - (2k + 3)y - 1 = 0$?

31) In the figure, ray OC stands on the line AB , ray OL and ray OM are angle bisectors of $\angle AOC$ and $\angle BOC$ respectively. Prove that $\angle LOM = 90^\circ$.



32) Factorise: $4(x^2 + 1)^2 + 13(x^2 + 1) - 12$.

(Or)

Factorise : $9(x-2y)^2 - 4(x-2y) - 13$

33) If x and y be two positive real numbers such that $8x^3 + 27y^3 = 730$ and $2x^2y + 3xy^2 = 15$, then evaluate $2x + 3y$.

34) The side BC of a triangle ABC produced such that D is on ray BC . The bisectors of $\angle A$ meets BC in L . Prove that $\angle ABC + \angle ACD = 2\angle ALC$

(Or)

The side QR of ΔPQR is produced to a point S. If the bisectors of $\angle PQR$ and $\angle PRS$ meet at point T, then prove that $\angle QTR = \frac{1}{2} \angle QPR$.

35) Simplify $\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$

(Or)

If a,b,c are all non-zero real numbers and $a+b+c=0$ then prove that $\frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab} = 3$

36) If $(a+b) = 10, a^2+b^2=58$, find the value of a^3+b^3

37) In which quadrant or axis do the following points lie?

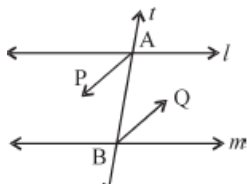
A (4,2), B (-3,5), C (-2, -5), D (4, -2) E (0, -5) and (6,0)

38) Solve the equation $2x+4=3x+1$ and represents the solution

i) Number line (One Variable)

ii) Cartesian Plane (Two variables)

39) In the figure, bisectors AP and BQ of the alternate interior angles are parallel. Show that $l \parallel m$.



SECTION-D

40) If $(x^4 + ax^3 - 7x^2 + 8x + b)$ exactly divisible by $(x + 2)$ as well as $(x - 3)$, then find the values of a and b

(Or)

The polynomial $f(x) = x^4 + 2x^3 - 3x^2 - ax + b$ is divided by $(x - 1)$ and $(x + 1)$ leaves remainders 5 and 19 respectively. Find the values of a and b. Hence, find the remainder when $f(x)$ is divided by

$(x - 2)$.

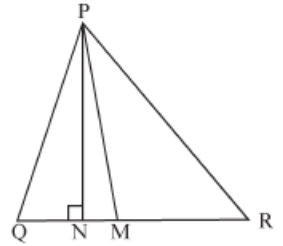
41) Draw the graph of the equation $2(x + 3) - 3(1 + y) = 0$. Also, find the point where the line meets coordinate axis

42) Points A (5, 3), B (-2, 3) and D (5, -4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C. Also find the area of the rectangle so formed?

43) Bisectors of angles B and C of a triangle ABC intersect each other at the point O. Prove that

$$\angle BOC = 90^\circ + \frac{1}{2}(\angle A).$$

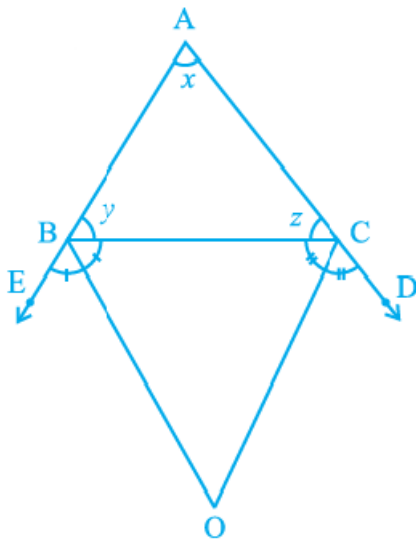
44) In the figure, $\angle Q > \angle R$ and M is a point on QR such that PM is the bisector of $\angle QPR$. If the



perpendicular from P on QR meets QR at N, prove that $\angle MPN = \frac{1}{2}(\angle Q - \angle R)$

45) Using factor theorem factories, the $x^4+3x^3+2x^2-3x-3$

46) In Fig. 6.38, the sides AB and AC of ΔABC are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at point O, then prove that $\angle BOC = 90^\circ - \frac{1}{2} \angle BAC$.



47) Sum of the digits of a two-digit number is 14. If we add 18 to the original number, the digits interchange their places. Write two equations for these two statements.

(Or)

The coach of a cricket team buys 3 bats and 6 balls for ₹ 3900. Later, she buys another bat and 3 more balls of the same kind for ₹ 1300. Represent this situation as two equations of Linear equation in two variables?