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Educational Services Private Limited
NEET, JEE(Main/Advanced)
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Educational Services Private Limited

9th, 10th, NEET, JEE(Main/Advanced)

अभ्यास ही सबसे बड़ा गुरु है।

CLASS : XI (MATHEMATICS)

DPP

DAILY PRACTICE PROBLEM

DPP-41 to 50

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 41

Total Marks : 27

Max. Time : 30 min.

Topics : Fundamentals of Mathematics, Quadratic Equations

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1	(3 marks, 3 min.)	[3, 3]
Multiple choice objective ('–1' negative marking) Q.2	(5 marks, 4 min.)	[5, 4]
Assertion and Reason (no negative marking) Q.6	(3 marks, 3 min.)	[3, 3]
Subjective Questions ('–1' negative marking) Q.3,4,5,7	(4 marks, 5 min.)	[16, 20]

1. The equation $|x + 1| . |x - 1| = a^2 - 2a - 3$ can have real solutions for 'x', if 'a' lies in the interval

(A) $(-\infty, -1] \cup [3, \infty)$ (B) $[1 - \sqrt{5}, 1 + \sqrt{5}]$

(C) $[1 - \sqrt{5}, -1] \cup [3, 1 + \sqrt{5}]$ (D) None of these

2. Let the number of positive and negative solutions of $x^2 - 6x - |5x - 15| - 5 = 0$ be ℓ and m respectively, then

(A) $\ell + m = 2$ (B) $3\ell + m = 4$ (C) $3\ell - m = 0$ (D) $3\ell - m = 2$

3. If α, β are the roots of the equation $x^2 - px + q = 0$, then find the equaiton the roots of which are $(\alpha^2 - \beta^2)(\alpha^3 - \beta^3)$ and $\alpha^3\beta^2 + \alpha^2\beta^3$.

4. If the roots of the equation $ax^2 + bx + c = 0$ are of the form $\frac{k+1}{k}$ and $\frac{k+2}{k+1}$, prove that $(a + b + c)^2 = b^2 - 4ac$.

5. Find a quadratic equation whose one root is square root of $-47 + 8\sqrt{-3}$.

6. **STATEMENT 1 :** Equation $(x^2 - 1)^2 + (x^2 + x - 2)^2 + (x^2 - 3x + 2)^2 = 0$ has only one solution.

STATEMENT 2 : If $|a_1| + |a_2| + ... + |a_n| = 0$, then $a_1 = a_2 = ... = a_n = 0$.

(A) STATEMENT-1 is True, STATEMENT-2 is True ; STATEMENT-2 is a correct explanation for STATEMENT-1

(B) STATEMENT-1 is True, STATEMENT-2 is True ; STATEMENT-2 **is NOT** a correct explanation for STATEMENT-1

(C) STATEMENT-1 is True, STATEMENT-2 is False

(D) STATEMENT-1 is False, STATEMENT-2 is True

7. If α and β are the roots of $x^2 - p(x + 1) - c = 0$, show that $(\alpha + 1)(\beta + 1) = 1 - c$.

Hence prove that $\frac{\alpha^2 + 2\alpha + 1}{\alpha^2 + 2\alpha + c} + \frac{\beta^2 + 2\beta + 1}{\beta^2 + 2\beta + c} = 1$.

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 42

Total Marks : 23

Max. Time : 22 min.

Topics : Fundamentals of Mathematics, Quadratic Equations

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1	(3 marks, 3 min.)	[3, 3]
Multiple choice objective (no negative marking) Q.2	(5 marks, 4 min.)	[5, 4]
Subjective Questions (no negative marking) Q.3,4,5,6,7	(4 marks, 5 min.)	[15, 15]

1. If roots of the quadratic equation $x^2 - x \ln(a^2 - 3a + 2) + a^2 - 4 = 0$ are of opposite sign, then

(A) $a \in (-2, 2)$ (B) $a \in (-\infty, 1) \cup (2, \infty)$

(C) $a \in (-\infty, -2) \cup (2, \infty)$ (D) $a \in (-2, 1)$

2. The complete solution set of the inequation $x - \frac{2(K-1)}{K} \le \frac{2}{3K}(x + 1)$ is given by

(A) $(-\infty, 2]$ if $K > \frac{2}{3}$ (B) $[2, \infty)$ if $0 < K < \frac{2}{3}$ (C) $(-\infty, 2]$ if $K < 0$ (D) R if $K = \frac{2}{3}$

3. If α, β be the roots of the equation $\lambda^2(x^2 - x) + 2\lambda x + 3 = 0$ and λ_1, λ_2 be the two values of λ for which α and β are connected by the relation $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{4}{3}$ then find the equation whose roots are λ_1^2/λ_2 and λ_2^2/λ_1.

4. Solve $\frac{x^2 - |x| - 12}{x - 3} \ge 2x$

5. Solve $|x - 6| > |x^2 - 5x + 9|$

6. If α, β are the roots of the equation $x + 1 = \lambda x(1 - \lambda x)$ and λ_1, λ_2 be the two values of λ determined from the equation $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \pi - 2$, show that $\frac{\lambda_1^2}{\lambda_2^2} + \frac{\lambda_2^2}{\lambda_1^2} + 2 = 4\left(\frac{\pi+1}{\pi-1}\right)^2$.

7. If α, β are the roots of $x^2 + px + q = 0$ and also of $x^{2n} + p^n x^n + q^n = 0$ and if $\frac{\alpha}{\beta}, \frac{\beta}{\alpha}$ are the roots of $x^n + 1 + (x + 1)^n = 0$, then prove that n must be an even integer.

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 43

Total Marks : 22

Max. Time : 20 min.

Topic : Complex Number

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3,4	**(3 marks, 3 min.)**	**[12, 12]**
Multiple choice objective (no negative marking) Q.5,6	**(5 marks, 4 min.)**	**[10, 8]**

1. If $z = \left(\frac{\sqrt{3}}{2}+\frac{i}{2}\right)^5 + \left(\frac{\sqrt{3}}{2}-\frac{i}{2}\right)^5$, then :

(A) Re(z) = 0
(B) Im (z) = 0
(C) Re (z) > 0, Im (z) > 0
(D) Re (z) > 0, Im (z) < 0

2. If $\left|\frac{z_1 - 3z_2}{3 - z_1\bar{z}_2}\right| = 1$ and $|z_2| \neq 1$, then $|z_1|$ is

(A) 3 (B) 1 (C) 2 (D) 4

3. If $Z_1 = 1 - i$ and $Z_2 = -2 + 4i$, then $\text{Im}\left(\frac{Z_1 Z_2}{\bar{Z}_1}\right)$ is equal to

(A) 2 (B) 4 (C) 8 (D) none of these

4. The conjugate complex number of $\frac{2-i}{(1-2i)^2}$ is :

(A) $\frac{2}{25} + \frac{11}{25}i$ (B) $\frac{2}{25} - \frac{11}{25}i$ (C) $-\frac{2}{25} + \frac{11}{25}i$ (D) $-\frac{2}{25} - \frac{11}{25}i$

5. For $n \in N$, $\left(\frac{2i}{1+i}\right)^n$ is a positive integer if n =

(A) 2 (B) 4 (C) 8 (D) 16

6. If $z_1 = a + ib$ & $z_2 = c + id$ $(a, b, c, d \in R)$ are complex numbers such that $|z_1| = |z_2| = 1$ and $\text{Re}(z_1 z_2) = 0$, then the pair of complex numbers $w_1 = a + ic$ & $w_2 = b + id$ satisfies :

(A) $|w_1| = 1$ (B) $|w_2| = 1$ (C) $\text{Re}(w_1 w_2) = 0$ (D) none

MATHEMATICS
DPP
DAILY PRACTICE PROBLEMS

DPP No. 44

Total Marks : 25

Max. Time : 24 min.

Topics : Fundamentals of Mathematics, Complex Number, Points & Straight Lines

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,	**(3 marks, 3 min.)**	**[3, 3]**
Multiple choice objective (no negative marking) Q.2,3	**(5 marks, 4 min.)**	**[10, 8]**
Fill in the Blanks (no negative marking) Q.4,5	**(4 marks, 4 min.)**	**[8, 8]**
Subjective Questions (no negative marking) Q.6	**(4 marks, 5 min.)**	**[4, 5]**

1. If $(0.5)^{\alpha} > (0.5)^{\beta}$, where $\alpha, \beta \in R$, then

(A) $\alpha > \beta$

(B) $\alpha < \beta$

(C) only possibility $\alpha = \beta = 0$

(D) depends upon sign of α & β

2. The simultaneous equations, $y = x + 2|x|$ & $y = 4 + x - |x|$ have the solution set given by:

(A) $\left(\frac{4}{3}, \frac{4}{3}\right)$ (B) $\left(4, \frac{4}{3}\right)$ (C) $\left(-\frac{4}{3}, \frac{4}{3}\right)$ (D) $\left(\frac{4}{3}, 4\right)$

3. If $z = 1 + i$ then z^{10} reduces to :

(A) a purely imaginary number

(B) an imaginary number

(C) a purely real number

(D) a complex number

4. The point (11 , 10) divides the line segment joining the points (5 , – 2) and (9 , 6) in the ratio :

(A) 1 : 3 internally (B) 1 : 3 externally (C) 3 : 1 internally (D) 3 : 1 externally

5. The points (0, –1), (6, 7), (–2, 3), (8, 3) are the vertices of a rectangle. **[True / False]**

6. The point on y-axis equidistant from the points (2, 3) and (–4, 1) is....................

MATHEMATICS
DPP
DAILY PRACTICE PROBLEMS

DPP No. 45

Total Marks : 19

Max. Time : 20 min.

Topic : Straight Lines

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1,2,3,4,5	(3 marks, 3 min.)	[15, 15]
Subjective Questions (no negative marking) Q.6	(4 marks, 5 min.)	[4, 5]

1. If A & B are the points (– 3, 4) and (2, 1), then the co–ordinates of the point C on AB produced such that AC = 2 BC are :

(A) (2, 4) (B) (3, 7) (C) (7, –2) (D) $\left(-\frac{1}{2}, \frac{5}{2}\right)$

2. If in triangle ABC, $A \equiv (1, 10)$, circumcentre $\equiv \left(-\frac{1}{3}, \frac{2}{3}\right)$ and orthocentre $\equiv \left(\frac{11}{3}, \frac{4}{3}\right)$ then the co-ordinates of mid-point of side opposite to A is :

(A) (1, – 11/3) (B) (1, 5) (C) (1, – 3) (D) (1, 6)

3. Harmonic conjugate of the point (5, 13) with respect to (2, –5) and (3, 1) is

(A) $\left(1, \frac{13}{5}\right)$ (B) $\left(\frac{13}{5}, 1\right)$ (C) $\left(\frac{13}{5}, -\frac{7}{5}\right)$ (D) $\left(-\frac{7}{5}, \frac{13}{5}\right)$

4. An equilateral triangle has each of its sides of length 6 cm. If (x_1, y_1) ; (x_2, y_2) & (x_3, y_3) are its vertices, then the value of the determinant $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}^2$ is equal to :

(A) 192 (B) 243 (C) 486 (D) 972

5. ABC is a triangle. The coordinates of whose vertices are (–2, 4), (10, –2) and (–2, –8). G is the centroid of triangle ABC, then area of the triangle GBC is equal to

(A) 26 (B) 36 (C) 24 (D) 39

6. One end of a thin straight elastic string is fixed at A (4 , – 1) and the other end B is at (1 , 2) in the unstretched condition . If the string is stretched to triple its length to the point C , then find the co–ordinates of this point .

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 46

Total Marks : 28

Max. Time : 28 min.

Topics : Straight Lines, Solutions of Triangles

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1,2,3	(3 marks, 3 min.)	[9, 9]
Multiple choice objective (no negative marking) Q.4	(5 marks, 4 min.)	[5, 4]
True or False (no negative marking) Q.5	(2 marks, 2 min.)	[2, 2]
Subjective Questions (no negative marking) Q.7	(4 marks, 5 min.)	[4, 5]
Match the Following (no negative marking) Q.6	(8 marks, 8 min.)	[8, 8]

1. Equation of line inclined at an angle of 45º with positive x-axis and dividing the line joining the points (3, –1) and (8, 9) in the ratio 2 : 3 internally, is

(A) $x - y - 2 = 0$ (B) $3x - 3y + 1 = 0$

(C) $\sqrt{3}\,x - \sqrt{3}\,y + 2 = 0$ (D) None of these

2. The straight line $2x + 5y - 1 = 0$ and $4ax - 5y + 2 = 0$ are mutually perpendicular, then the value of 'a' will be

(A) $\frac{25}{8}$ (B) $-\frac{1}{2}$ (C) $-\frac{25}{8}$ (D) $\frac{1}{2}$

3. A line passes through (2, 2) and is perpendicular to the line $3x + y = 3$. Its y-intercept is:

(A) 1/3 (B) 2/3 (C) 1 (D) 4/3

4. The vertices of a triangle are $A(x_1, x_1 \tan\alpha)$, $B(x_2, x_2 \tan\beta)$ and $C(x_3, x_3 \tan\gamma)$. If the circumcentre of triangle ABC coincides with the origin and H(a, b) be the orthocentre, then $\frac{a}{b}$ =

(A) $\frac{x_1 + x_2 + x_3}{x_1 \tan\alpha + x_2 \tan\beta + x_3 \tan\gamma}$ (B) $\frac{x_1\cos\alpha + x_2\cos\beta + x_3\cos\gamma}{x_1\sin\alpha + x_2\sin\beta + x_3\sin\gamma}$

(C) $\frac{\tan\alpha + \tan\beta + \tan\gamma}{\tan\alpha.\tan\beta.\tan\gamma}$ (D) $\frac{\cos\alpha + \cos\beta + \cos\gamma}{\sin\alpha + \sin\beta + \sin\gamma}$

5. The circumcentre, orthocentre, incentre and centroid of the triangle formed by the points A(1, 2), B(4, 6), C(–2, –1) are collinear. **[True or False]**

6. Find the equations to the straight lines which pass through the point (1, –2) and cut off equal distances from the two axes.

7. Match entry of column-I with **one or more than one** entries of column-II.

Column-I		Column-II	
(A)	Four lines $x + 3y - 10 = 0$, $x + 3y - 20 = 0$, $3x - y + 5 = 0$ and $3x - y - 5 = 0$ form a figure which is	(p)	a quadrilateral which is neither a parallelogram nor a trapezium
(B)	The point A(1, 2), B(2, –3), C(–1, –5) and D(–2, 4) in order are vertices of	(q)	a parallelogram
(C)	The lines $7x + 3y - 33 = 0$, $3x - 7y + 19 = 0$, $3x - 7y - 10 = 0$ and $7x + 3y - 4 = 0$ form a figure which is	(r)	a rectangle of area 10 sq.units
(D)	Four lines $4y - 3x - 7 = 0$, $3y - 4x + 7 = 0$, $4y - 3x - 21 = 0$, $3y - 4x + 14 = 0$ form a figure which is	(s)	a square

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 47

Total Marks : 27

Max. Time : 28 min.

Topic : Straight Lines

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3,4,5	**(3 marks, 3 min.)**	**[15, 15]**
Subjective Questions (no negative marking) Q.6	**(4 marks, 5 min.)**	**[4, 5]**
Match the Following (no negative marking) Q.7	**(8 marks, 8 min.)**	**[8, 8]**

1. B & C are fixed points having co–ordinates (3, 0) and (– 3, 0) respectively . If the vertical angle BAC is 90º, then the locus of the centroid of the Δ ABC has the equation :
(A) $x^2 + y^2 = 1$ (B) $x^2 + y^2 = 9$ (C) $9(x^2 + y^2) = 1$ (D) $9(x^2 + y^2) = 4$

2. The coordinates of the midpoints of the sides of a triangle ABC are D(2, 1), E(5, 3) and F(3, 7). Equation of median of the triangle ABC passing through F is
(A) $10x + y - 37 = 0$ (B) $x + y - 10 = 0$ (C) $x - 10y + 67 = 0$ (D) none of these

3. The co–ordinates of the orthocentre of the triangle bounded by the lines, $4x - 7y + 10 = 0$; $x + y = 5$ and $7x + 4y = 15$ is :
(A) (2, 1) (B) (– 1, 2) (C) (1, 2) (D) (1, – 2)

4. The family of straight lines $3(a + 1)x - 4(a - 1)y + 3(a + 1) = 0$ for different values of 'a' passes through a fixed point whose coordinates are
(A) (1, 0) (B) (–1, 0) (C) (–1, –1) (D) none of these

5. The co–ordinates of a point P on the line $2x - y + 5 = 0$ such that $|PA - PB|$ is maximum, where A is (4, – 2) and B is (2, – 4) will be :
(A) (11, 27) (B) (– 11, – 17) (C) (– 11, 17) (D) (0, 5)

6. Given vertices A(1, 1), B(4, –2) and C(5, 5) of a triangle, find the equation of the perpendicular dropped from C to the interior bisector of the angle A.

7. **Match the column**

Column – I		**Column – II**	
(A)	Area of the region enclosed by $2|x| + 3|y| \le 6$ is	(p)	12
(B)	OPQR is a square and M, N are the mid points of the sides PQ and QR respectively. If the ratio of the areas of the square and the triangle OMN is $\lambda : 6$, then λ is equal to	(q)	2
(C)	If slope of the straight line through the point (1, 2), whose distance from the point (3, 1) has the greatest value, is $\frac{m}{6}$, then m is equal to	(r)	4
(D)	Area of ΔABC is 20 sq. units where points A, B and C are (4, 6), (10, 14) and (x, y) respectively. If AC is perpendicular to BC, then number of positions of C is	(s)	16

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 48

Total Marks : 22

Max. Time : 20 min.

Topic : Straight Lines

Type of Questions		M.M., Min.
Comprehension (no negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Single choice Objective (no negative marking) Q.4,5,6	(3 marks, 3 min.)	[9, 9]
Multiple choice objective (no negative marking) Q.7	(5 marks, 4 min.)	[5, 4]

COMPREHENSION (Q.No. 1 to 3)

Consider the family of lines passing through the point of intersection of lines

L_1 : $3x + 4y + 7 = 0$

L_2 : $4x - 3y + 1 = 0$

1. A member of family which bisects the angle between them and is closer to origin, is

(A) $x - 7y - 6 = 0$ (B) $7x + y + 8 = 0$ (C) $7x - y + 6 = 0$ (D) $7x + y + 4 = 0$

2. A member of family with gradient – 2 has y-intercept equal to

(A) 2 (B) –3 (C) 1 (D) –2

3. A member of this family whose slope is not defined is

(A) $y + 1 = 0$ (B) $x = 1$ (C) $3x = 4$ (D) $x + 1 = 0$

4. Chords of the curve $4x^2 + y^2 - x + 4y = 0$ which subtend a right angle at the origin pass through a fixed point whose co-ordinates are :

(A) $\left(\frac{1}{5}, -\frac{4}{5}\right)$ (B) $\left(-\frac{1}{5}, \frac{4}{5}\right)$ (C) $\left(\frac{1}{5}, \frac{4}{5}\right)$ (D) $\left(-\frac{1}{5}, -\frac{4}{5}\right)$

5. The image of the pair of lines represented by $ax^2 + 2h\,xy + by^2 = 0$ by the line mirror $y = 0$ is :

(A) $ax^2 - 2h\,xy - by^2 = 0$ (B) $bx^2 - 2h\,xy + ay^2 = 0$

(C) $bx^2 + 2h\,xy + ay^2 = 0$ (D) $ax^2 - 2h\,xy + by^2 = 0$

6. The value of k so that the equation $12x^2 - 10xy + 2y^2 + 11x - 5y + k = 0$ represents a pair of lines is

(A) – 2 (B) 2 (C) 7 (D) – 7

7. The sides AB, BC and CA of a triangle ABC are given by the equation $3x + 4y - 6 = 0$, $12x - 5y - 3 = 0$ and $x + y + 2 = 0$ respectively. Find the equation of bisector of internal angle B.

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 49

Total Marks : 19

Max. Time : 20 min.

Topics : Fundamentals of Mathematics, Straight Lines

Type of Questions		M.M., Min.
Comprehension (no negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Single choice Objective (no negative marking) Q.4,5	(3 marks, 3 min.)	[6, 6]
Subjective Questions (no negative marking) Q.6	(4 marks, 5 min.)	[4, 5]

COMPREHENSION (Q.No. 1 to 3)

If $a < b < c < d$, then

1. $|x - a| + |x - b| + |x - c| + |x - d| = p$ has
- (i) two solutions if $p > c + d - a - b$
- (ii) infinite solutions if $p = c + d - a - b$
- (iii) no solution if $p < c + d - a - b$

2. $|x - a| + |x - b| + |x - c| = q$ has
- (i) two solutions if $q > c - a$
- (ii) one solution if $q = c - a$ and
- (iii) no solution if $q < c - a$

1. Number of solutions of the equation $|x - 1| + |x - 2| + |x - 3| + |x - 4| = 7$ is

(A) 0 (B) 1 (C) 2 (D) infinite

2. Let ℓ be the number of solutions obtained in above question, then number of solutions of the equation $|x - 2| + |x - 3| + |x - 4| = \ell$ is

(A) 0 (B) 1 (C) 2 (D) infinite

3. Let k be the number of solution obtained in Q.No. 2, then number of solution of $|x + 1| + |x| + |x - 1| = k$ is

(A) 0 (B) 1 (C) 2 (D) infinite

4. If the lines $2x + y - 3 = 0$, $5x + ky - 3 = 0$ and $3x - y - 2 = 0$ are concurrent, then 'k' is equal to

(A) -2 (B) 3 (C) -3 (D) 2

5. A light ray coming along the line $3x + 4y = 5$ gets reflected from the line $ax + by = 1$ and goes along the line $5x - 12y = 10$, then

(A) $a = \frac{64}{115}$, $b = \frac{112}{5}$

(B) $a = \frac{14}{15}$, $b = \frac{-8}{115}$

(C) $a = \frac{64}{115}$, $b = \frac{-8}{115}$

(D) $a = \frac{14}{15}$, $b = \frac{112}{15}$

6. If the lines $L_1 : 2x - 3y - 6 = 0$, $L_2 : x + y - 4 = 0$ and $L_3 : x + 2 = 0$ taken pair wise in order constitute the angles A, B and C respectively of ΔABC, then find the equation whose roots are tan A, tan B and tan C

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 50

Total Marks : 20

Max. Time : 19 min.

Topics : Fundamentals of Mathematics, Straight Lines

Type of Questions		M.M., Min.
Comprehension (no negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Single choice Objective (no negative marking) Q.4,5	(3 marks, 3 min.)	[6, 6]
Multiple choice objective (no negative marking) Q.6	(5 marks, 4 min.)	[5, 4]

COMPREHENSION (Q.No. 1 to 3)

Let $||x - a| - b| = k$. Then

(i) $k = 0, b > 0$ $\Rightarrow$ equation has two solutions

(ii) $b > k > 0$ $\Rightarrow$ equation has four solutions

(iii) $b = k > 0$ $\Rightarrow$ equation has three solutions

(iv) $0 < b < k$ $\Rightarrow$ equation has two solutions

1. If number of solutions of $||x + 1| - 2| = 1$ is m, then m =

(A) 1 (B) 2 (C) 3 (D) 4

2. If number of solutions of $||x - 2| - 3| = m$ is ℓ, then ℓ =
(where m is obtained in Q.No. 1)

(A) 1 (B) 2 (C) 3 (D) 4

3. Number of solutions of $||x - 2| - 5| = \ell + 3$ is
(where ℓ is obtained in Q.No. 2)

(A) 1 (B) 2 (C) 3 (D) 4

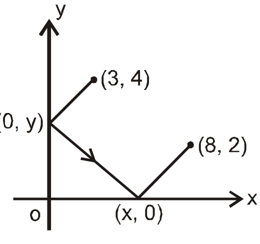
4. Given the family of lines, $a(3x + 4y + 6) + b(x + y + 2) = 0$. The line of the family situated at the greatest distance from the point P (2, 3) has equation :

(A) $4x + 3y + 8 = 0$ (B) $5x + 3y + 10 = 0$ (C) $15x + 8y + 30 = 0$ (D) none

5. Suppose a ray of light leaves the point (3, 4) reflects from the y-axis and moves towards the x-axis, then reflects from the x-axis, and finally arrives at the point (8, 2), then the value of x, is

(A) $x = 4\frac{1}{2}$ (B) $x = 4\frac{1}{3}$

(C) $x = 4\frac{2}{3}$ (D) $5\frac{1}{3}$



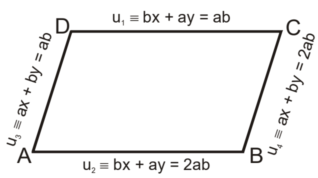
6. In a parallelogram as shown in the figure $(a \neq b)$:

(A) equation of the diagonal AC is
$(a + b)x + (a + b)y = 3ab$

(B) equation of the diagonal BD is $u_1u_4 - u_2u_3 = 0$

(C) co-ordinates of the points of intersection of the two diagonals are $\left(\frac{3ab}{2(a+b)}, \frac{3ab}{2(a+b)}\right)$

(D) the angle between the two diagonals is $\pi/3$.



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9th, 10th, NEET, JEE(Main/Advanced)

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CLASS : XI (MATHEMATICS)

DPP

DAILY PRACTICE PROBLEM

Solutions

DPP-41 to 50

DPP 41 TO 50 (ANSWER KEY)

DPP NO. - 41

1. (A) **2.** (A)(B)(D) **3.** $t^2 - St + P = 0$ where $S = p[p^4 - 5p^2q + 5q^2]$ and $P = p^2q^2(p^4 - 5p^2q + 4q^2)$

5. $x^2 \pm 2x + 49 = 0$ **6.** (B)

DPP NO. - 42

1. (D) **2.** (A)(B)(C)(D)

3. $3x^2 + 68x - 18 = 0$, $\lambda^2 - 4\lambda - 6 = 0$, $(\lambda \neq 0)$

4. $x \in (-\infty, 3)$ **5.** $x \in (1, 3)$

6. $\left[\dfrac{(\lambda_1+\lambda_2)^2 - 2\lambda_1\lambda_2}{\lambda_1\lambda_2}\right]^2$

DPP NO. - 43

1. (B) **2.** (A) **3.** (A) **4.** (D) **5.** (C)(D)

A

6. (A)(B)(C)

DPP NO. - 44

1. (B) **2.** (C)(D) **3.** (A)(B)(D) **4.** (D)

5. True **6.** (0, –1)

DPP NO. - 45

1. (C) **2.** (A) **3.** (C) **4.** (D) **5.** (C) **6.** (–5, 8)

DPP NO. - 46

1. (A) **2.** (A) **3.** (D) **4.** (A)(D)

5. False **6.** $x + y + 1 = 0$, $x - y - 3 = 0$

7. (A) → (q,r,s), (B) → (p), (C) → (q,s), (D) → (q)

DPP NO. - 47

1. (A) **2.** (A) **3.** (C) **4.** (B) **5.** (B)

6. $x = 5$ **7.** (A)→(p), (B)→(s), (C)→(p), (D)→(r)

DPP NO. - 48

1. (A) **2.** (B) **3.** (D) **4.** (A) **5.** (D) **6.** (B)

7. $3x - 11y + 9 = 0$

DPP NO. - 49

1. (C) **2.** (B) **3.** (A) **4.** (A)

5. (C)(D) **6.** $2x^3 - 15x^2 + 28x - 15 = 0$

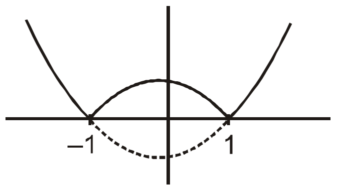
DPP NO. - 50

1. (D) **2.** (B) **3.** (C) **4.** (A) **5.** (B) **6.** (A)(B)(C)

DPP 41 TO 50 (HINTS AND SOLUTIONS)

DPP NO. - 41

1. $|x + 1| \,.\, |x - 1| = a^2 - 2a - 3$
$|(x + 1)(x - 1)| = (a - 1)^2 - 43 = (a + 1)(a - 3)$
for Solution



$(a + 1)(a - 3) \geq 0$
$\Rightarrow$ at $(-\infty, -1) \cup [3, \infty)$

2. If $5x \geq 15$ i.e. $x \geq 3$, then
$x^2 - 6x - 5x + 15 - 5 = 0$ i.e. $x^2 - 11x + 10 = 0$
i.e. $x = 1, 10$
$\therefore$ $x = 10$ is a solution
if $5x < 15$ i.e. $x < 3$, then $x^2 - 6x + 5x - 15 - 5 = 0$
i.e. $x^2 - x - 20 = 0$ i.e. $x = 5, -4$
$\therefore$ $x = -4$ is a solution
Thus $\ell = 1$, $m = 1$

3. $\alpha + \beta = p$, $\alpha\beta = q$ ...(i)
If the given roots be A and B, then
$A = (\alpha - \beta)^2 (\alpha + \beta) (\alpha^2 + \beta^2 + \alpha\beta)$
$= (p^2 - 4q)\, p(p^2 - q) = p[p^4 - 5p^2q + 4q^2]$
$B = \alpha^2\beta^2 (\alpha + \beta) = q^2p$
$\therefore$ $S = A + B = p[p^4 - 5p^2q + 5q^2]$
$P = p^2q^2(p^4 - 5p^2q + 4q^2)$
The required equation is $t^2 - St + P = 0$

4. We have $S = \dfrac{k+1}{k} + \dfrac{k+2}{k+1} = \dfrac{-b}{a}$

and $P = \dfrac{k+1}{k} \cdot \dfrac{k+2}{k+1} = \dfrac{c}{a}$

or $\dfrac{k+2}{k} = \dfrac{c}{a}$ or $\dfrac{2}{k} = \dfrac{c}{a} - 1 = \dfrac{c-a}{a}$

$\therefore$ $k = \dfrac{2a}{c-a}$

Now eliminate k.
Putting the value of k in 1st relation, we get

$\dfrac{c+a}{2a} + \dfrac{2c}{(c+a)} = -\dfrac{b}{a}$

or $(a + c)^2 + 4ac = -2b(a + c)$
or $(a + c)^2 + 2b(a + c) = -4ac$
Add b^2 to both sides
$\therefore$ $(a + c + b)^2 = b^2 - 4ac$.

5. Split $\dfrac{1}{2}(8\sqrt{3}) = 4\sqrt{3}$ into two factors a, b such that $a^2 - b^2 = -47$ i.e., $1, 4\sqrt{3}$

Hence square root is $\pm(1 + 4\sqrt{3}\, i)$

$\therefore$ One root is $1 + 4\sqrt{3}\, i$ and other is its conjugate $1 - 4\sqrt{3}\, i$. Hence $S = 2$, $P = 49$

Similarly $-1 - 4\sqrt{3}\, i$ and $-1 + 4\sqrt{3}\, i$, are the roots.
$S = -2$, $P = 49$
$\therefore$ Equations are $x^2 \pm 2x + 49 = 0$

6. Statement-2 Since $|a_1| \geq 0, |a_2| \geq 0, \ldots\ldots, |a_n| \geq 0$
$\therefore$ $|a_1| + |a_2| + \ldots\ldots\ldots + |a_n| = 0$
$\Rightarrow$ $|a_1| = |a_2| = \ldots\ldots\ldots = |a_n| = 0$
$\Rightarrow$ $a_1 = a_2 = \ldots\ldots = a_n = 0$

Statement-1 $(x^2 - 1)^2 \geq 0$, $(x^2 + x - 2)^2 \geq 0$ and $(x^2 - 3x + 2)^2 \geq 0$

$\therefore$ $(x^2 - 1)^2 + (x^2 + x - 2)^2 + (x^2 - 3x + 2)^2 = 0$

$\Rightarrow$ $(x^2 - 1)^2 = (x^2 + x - 2)^2 = (x^2 - 3x + 2)^2 = 0$

$\Rightarrow$ $x^2 - 1 = 0$, $x^2 + x - 2 = 0$ and $x^2 - 3x + 2 = 0$
$\Rightarrow$ $x = 1$ is a unique solution

7. The given equation is $x^2 - px - (p + c) = 0$
$\therefore$ $\alpha + \beta = p$, $\alpha\beta = -(p + c)$
$(\alpha + 1)(\beta + 1) = \alpha\beta + (\alpha + \beta) + 1$
$= -p - c + p + 1 = 1 - c$ ...(i)

Again $\dfrac{\alpha^2 + 2\alpha + 1}{\alpha^2 + 2\alpha + c} + \dfrac{\beta^2 + 2\beta + 1}{\beta^2 + 2\beta + c}$

$= \dfrac{(\alpha+1)^2}{(\alpha+1)^2 - (1-c)} + \dfrac{(\beta+1)^2}{(\beta+1)^2 - (1-c)}$

$= \dfrac{(\alpha+1)^2}{(\alpha+1)^2 - (\alpha+1)(\beta+1)} + \dfrac{(\beta+1)^2}{(\beta+1)^2 - (\alpha+1)(\beta+1)}$, by (i)

$= \dfrac{\alpha+1}{\alpha-\beta} + \dfrac{\beta+1}{\beta-\alpha} = \dfrac{(\alpha+1)-(\beta+1)}{\alpha-\beta} = 1$

DPP NO. - 42

1. $x^2 - x\ell n(a^2 - 3a + 2) + a^2 - 4 = 0$
for defining logrithm
$a^2 - 3a + 2 > 0$
$(a - 1)(a - 2) > 0$
$a \in (-\infty, 1) \cup (2, \infty)$ ...(1)
roots are of opposite sign so
$f(0) = a^2 - 4 < 0$
$a \in (-2, 2)$ ...(2)
from (1) and (2)
$a \in (-2, 1)$

2. Now the inequality becomes

$$\left(1 - \frac{2}{3K}\right) x \leq \frac{2}{3K} + 2 - \frac{2}{K}$$

i.e. $x\left(1 - \dfrac{2}{3K}\right) \leq 2\left(1 - \dfrac{2}{3K}\right)$

i.e. $\left(1-\frac{2}{3K}\right)(x-2)\le 0$ i.e. $\frac{3k-2}{3k}(x-2)\le 0$

3. $3x^2 + 68x - 18 = 0$,
$\lambda^2 - 4\lambda - 6 = 0, (\lambda \ne 0)$

4. $\frac{x^2-|x|-12}{x-3} \ge 2x \Rightarrow \frac{x^2-|x|-12-2x(x-3)}{(x-3)} > 0$

$\frac{(-x^2+6x-|x|-12)}{(x-3)} < 0$

x > 0	**x < 0**
$\frac{(x^2-5x+12)}{(x-3)} < 0$	$\frac{x^2-7x+12}{(x-3)} < 0$
$\Rightarrow x \in (0, 3)$	$\frac{(x-4)(x-3)}{(x-3)} < 0$
	$x < 4$

$(-\infty, 3)$

5. $|x - 6| > |x^2 - 5x + 9|$
$|x - 6| > x^2 - 5x + 9$

x > 6	**x < 6**
$x - 6 > x^2 - 5x + 9$	$-x + 6 > x^2 - 5x + 9$
$x^2 - 6x + 15 < 0$	$x^2 - 4x + 3 < 0$
No solution	$(x - 1)(x - 3) < 0$

$x \in (1, 3)$

6. $(\pi - 1)\lambda^2 + 2\lambda - 1 = 0$ has roots λ_1, λ_2

$\frac{\lambda_1^2}{\lambda_2^2}+\frac{\lambda_2^2}{\lambda_1^2} + 2 = \left[\frac{\lambda_1^2+\lambda_2^2}{\lambda_1\lambda_2}\right]^2$

$= \left[\frac{(\lambda_1+\lambda_2)^2-2\lambda_1\lambda_2}{\lambda_1\lambda_2}\right]^2$ etc.

7. We have $\alpha + \beta = -p$ and $\alpha\beta = q$. ...(i)
Also since α, β are the roots of
$x^{2n} + p^nx^n + q^n = 0$
We have
$\alpha^{2n} + p^n \alpha^n + q^n = 0$ and $\beta^{2n} + p^n\beta^n + q^n = 0$
Subtracting the above relations, we get
$(\alpha^{2n} - \beta^{2n}) + p^n(\alpha^n - \beta^n) = 0$
$\therefore$ $\alpha^n + \beta^n = -p^n$ ...(ii)
If α/β or β/α is a root of
$x^n + 1 + (x + 1)^n = 0$, then
$(\alpha/\beta)^n + 1 + [(\alpha/\beta) + 1]^n = 0$
or $(\alpha^n + \beta^n) + (\alpha + \beta)^n = 0$
or $-p^n + (-p)^n = 0$, by (1) and (2)
Above is possible only when n is even.

DPP NO. - 43

1. $z = \left(\frac{\sqrt{3}}{2}+i\frac{1}{2}\right)^5 + \left(\frac{\sqrt{3}}{2}-i\frac{1}{2}\right)^5$

$= \left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)^5 + \left(\cos\frac{\pi}{6}-i\sin\frac{\pi}{6}\right)^5 = 2\cos\frac{5\pi}{6} \Rightarrow$
$\text{Im}(z) = 0$

2. $\left|\frac{z_1-3z_2}{3-z_1\bar{z}_2}\right| = 1 \Rightarrow \frac{z_1-3z_2}{3-z_1\bar{z}_2}\cdot\frac{\bar{z}_1-3\bar{z}_2}{3-\bar{z}_1z_2} = 1$

$\Rightarrow z_1\bar{z}_1 - 3(z_1\bar{z}_2+\bar{z}_1z_2) + 9|z_2|^2$
$= 9 - 3(z_1\bar{z}_2+\bar{z}_1z_2) + |z_1|^2|z_2|^2$

$\Rightarrow |z_1|^2 + 9|z_2|^2 = 9 + |z_1|^2|z_2|^2$

$\Rightarrow (|z_1|^2 - 9)(|z_2|^2 - 1) = 0$

$\Rightarrow |z_1|^2 = 9$ or $|z_2|^2 = 1$
but $|z_1| \ne 1 \Rightarrow |z_1| = 3$

3. $Z_1 = 1 - i$, $Z_2 = -2 + 4i$
$\frac{Z_1Z_2}{\bar{Z}_1} = \frac{(1-i)(-2+4i)}{(1+i)} = \frac{(-2i)(-2+4i)}{2} = 2i + 4$

$I_m\left(\frac{Z_1Z_2}{\bar{Z}_1}\right) = 2$

4. $\frac{2-i}{(1-2i)^2}$

conjugate $= \frac{2+i}{(1+2i)^2} = \frac{2+i}{1+4i-4}$

$= \frac{2+i}{-3+4i} \times \frac{-3-4i}{-3-4i} = \frac{-2-11i}{25}$

5. $\left(\frac{2i}{1+i}\right)^2 = \frac{-4}{(1+i^2+2i)} = 2i$

$\therefore \left(\frac{2i}{1+i}\right)^4 = -4$

$\therefore \left(\frac{2i}{1+i}\right)^8 = 16$

$\therefore$ $n = 8k,\ k \in N$

6. $z_1 = a + ib \Rightarrow a^2 + b^2 = 1$ ..... (1) $(\because |z_1|=1)$
$z_2 = c + id \Rightarrow c^2 + d^2 = 1$ ..... (2) $(\because |z_2|=1)$
and $\text{Re}(z_1 z_2) = 0$
$\Rightarrow ac - bd = 0 \Rightarrow ac = bd$

$\Rightarrow \frac{a}{b}=\frac{d}{c}=r$ (let) $\Rightarrow a = br$ & $d = cr$

by (1) $b^2(1+r^2)=1$
by (2) $c^2(1+r^2)=1$ $\Bigg\} \Rightarrow b^2 = c^2$ & $a^2 = d^2$

(1) Is $b^2(1+r^2)=1$
(2) Is $c^2(1+r^2)=1$ $\Rightarrow$ $b^2 = c^2$ & $a^2 = d^2$

Now $|w_1| = \sqrt{a^2+c^2} = \sqrt{a^2+b^2} = 1$

$|w_2| = \sqrt{b^2+d^2} = \sqrt{c^2+d^2} = 1$

also $\text{Re}(w_1w_2) = \text{Re}(ab - cd) = 0$

DPP NO. - 44

1. $(0.5)^{\alpha} > (0.5)^{\beta}$
$2^{\beta} > 2^{\alpha}$
$\beta > \alpha$.

2. $y = x + 2|x| \begin{cases} 3x & x > 0 \\ -x & x < 0 \end{cases}$

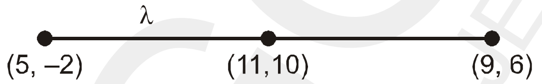
$y = 4 + x - |x| \begin{cases} x & x > 0 \\ 4+2x & x < 0 \end{cases}$

$\left(\frac{4}{3}, 4\right)$ $x > 0$ and $\left(\frac{-4}{3}, \frac{4}{3}\right)$.

3. $z = 1 + i$, $z^{10} = ?$
$z^2 = 2i$
$z^{10} = (z^2)5 = (2i)^5 = -32i$

4. Let point (11, 10) divide (5, –2) and (96) in the ratio λ : 1

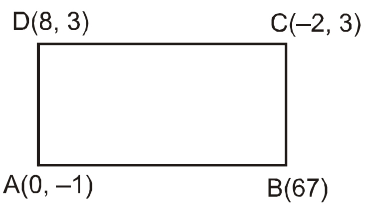
$$\frac{9\lambda+5}{\lambda+1} = 11$$



$9\lambda + 5 = 11\lambda + 11$
$-6 = 2\lambda \Rightarrow \lambda = -3$
$\Rightarrow$ point (11, 10) divide externally in the ratio 3 : 1

5. AB = $\sqrt{36+64}$ = 10

BC = $\sqrt{64+16}$ = $\sqrt{80}$



CD = $\sqrt{100}$ = 10

AD = $\sqrt{64+16}$ = $\sqrt{80}$

AC = $\sqrt{4+16} = \sqrt{20}$

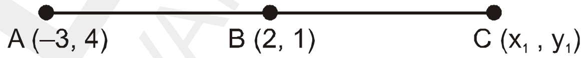
BD = $\sqrt{4+16} = \sqrt{20}$

$\therefore$ AB = CD , BC = AD and AC = BD
$\Rightarrow$ points are verticles of a rectangle

6. Let point be (0,4)
$2^2 + (y-3)^2 = 4^2 + (y-1)^2$
$4 + y^2 - 6y + 9 = 16 + y^2 - 2y + 1$
$-4 = 4y \Rightarrow y = -1$
point (0, –1)

DPP NO. - 45

1. A (–3 , 4) B (2, 1)
$\therefore$ AC = 2BC
$\Rightarrow$ B is mid point of AC



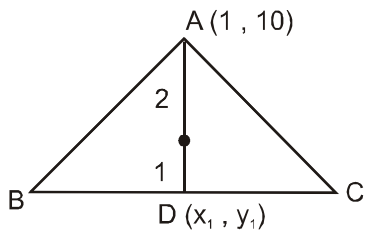
$\frac{-3+x_1}{2} = 2 \Rightarrow x_1 = 7$, $\frac{4+y_1}{2} = 1 \Rightarrow y_1 = -2$
co-ordinate c = (7, –2)

2. $A \equiv (1, 10)$ circum centre $\left(-\frac{1}{3}, \frac{2}{3}\right)$

ortho centre $\equiv \left(\frac{11}{3}, \frac{4}{3}\right)$

Centroid $\left(1, \frac{8}{9}\right)$

$\frac{2y_1+10}{3} = \frac{8}{9}$, $\frac{2x_1+1}{3} = 1$



$y_1 = -\frac{11}{3}$, $x_1 = 1$

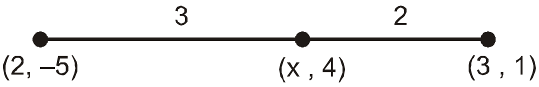
$D \equiv \left(1, -\frac{11}{3}\right)$

3. Let point (5, 13) divides (2, –5) and (3, 1) in the ratio λ : 1

$\frac{3\lambda+2}{\lambda+1} = 5 \Rightarrow \lambda = -3/2$

$\Rightarrow$ point (5, 13) divide externally in the ratio 3 : 2
then harmonic conjugate divide in the ratio 3 : 2 internally.

$x = \frac{9+4}{5} = \frac{13}{5}$



$y = \frac{3-10}{5} = \frac{-7}{5}$

$\Rightarrow$ point is $\left(\frac{13}{5}, -\frac{7}{5}\right)$

4. Area of $\Delta = \frac{\sqrt{3}}{4}(\text{side})^2 = \frac{\sqrt{3}}{4} \times 36 = 9\sqrt{3}$

Now, $\left| \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} \right| = 9\sqrt{3}$

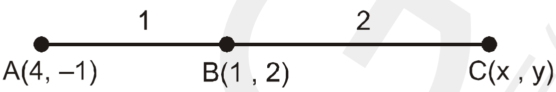
$\Rightarrow \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}^2 = 243 \times 4 = 972$

5. Area of $\Delta GBC = \frac{1}{3}$ (Area of ΔABC)

$= \frac{1}{3}(72) = 24$

6. AB : BC = 1 : 2

$\frac{x+8}{3} = 1 \Rightarrow x = -5$



and $\frac{y-2}{3} = 2 \Rightarrow y = 8$

point c (–5, 8)

DPP NO. - 46

1. Point M is $\left[\frac{2x8+3x3}{2+3}, \frac{2x9+3(-1)}{2+3}\right] \equiv [5, 3]$

$y - 3 \equiv 1(x - 5)$

$x - y - 2 = 0$

2. $\left(-\frac{2}{5}\right)\left(\frac{4a}{5}\right) = -1$

$-8a = -25$

$a = \frac{25}{8}$

3. $m_1 = -3$

$m_1 m_2 = -1$

$m_2 = 1/3$

$y - 2 = \frac{1}{3}(x - 2)$

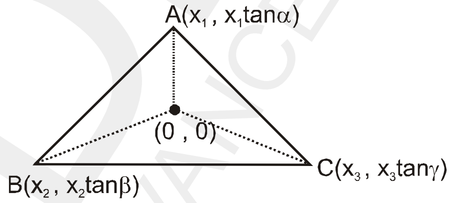
$3y - 6 = x - 2$

$x - 3y + 4 = 0$

y-intercept = 4/3

4. OA = OB = OC = R

$x = \frac{a}{3}, y = \frac{b}{3}$



centroid = $\left(\frac{a}{3}, \frac{b}{3}\right)$

also $G \equiv \left(\frac{x_1+x_2+x_3}{3}, \frac{x_1\tan\alpha + x_2\tan\beta + x_3\tan\gamma}{3}\right)$

$\Rightarrow \frac{a}{b} = \frac{x_1+x_2+x_3}{x_1\tan\alpha + x_2\tan\beta + x_3\tan\gamma}$

5. A (1, 2) , B(4, 6) C (–2 , –1)

$AB = \sqrt{3^2+4^2} = 5$, $BC = \sqrt{36+49} = \sqrt{85}$

$CA = \sqrt{9+9} = 3\sqrt{2}$ $\Rightarrow$ Circum centre , orthocentre, incentre and centroid cannot be collinear.

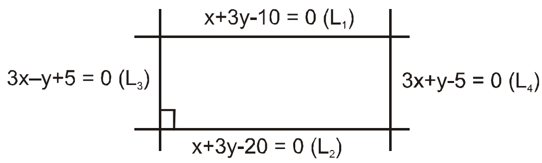
6. Equal intercept slope $\equiv \pm 1$

$y + 2 = \pm 1(x - 1)$

$x - y - 3 = 0$

$x + y + 1 = 0$

7. **(A)**



$\perp$ Distance between L_1 & $L_2 = \frac{10}{\sqrt{10}} = \sqrt{10}$

$\perp$ Distance between L_3 & $L_4 = \frac{10}{\sqrt{10}} = \sqrt{10}$

hence square

Area $= \sqrt{10} \times \sqrt{10} = 10$

(B) $AB = \sqrt{26}$

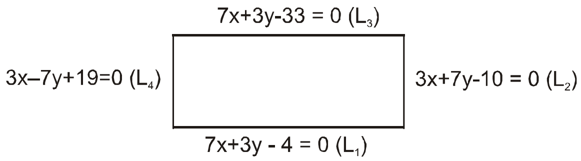
$BC = \sqrt{13}$

$CD = \sqrt{82}$

$AD = \sqrt{13}$

A quadrilateral

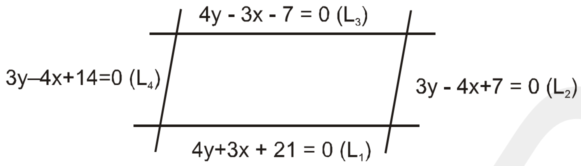
(C)



line are $\perp$

Perpendicular distance between L_1 & $L_3 \equiv \dfrac{29}{\sqrt{58}}$

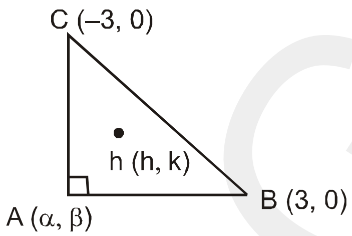
(D)



lines are not perpendicular. put opposite lines are parallel.
So parallelogram

DPP NO. - 47

1.



$\frac{\alpha}{3} = h \qquad \frac{\beta}{3} = k$

$a = 3h \qquad \beta = 3k$

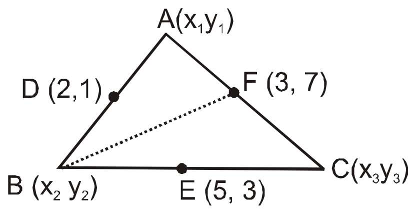
$AB^2 + AC^2 = BC^2$

$(3h - 3)^2 + 9k^2 + (3h + 3)^2 + 9k^2 = 36$

$18h^2 + 18k^2 = 18$

$h^2 + k^2 = 1$ locus $x^2 + y^2 = 1$

2.



$x_1+x_2 = 4$	$y_1+y_2 = 2$
$x_2 + x_3 = 10$	$y_2 + y_3 = 6$
$x_1 + x_3 = 6$	$y_3 + y_1 = 14$
$x_2 + x_{32} + x_3 = 10$	$y_1 + y_2 + y_3 = 11$
$x_2 = 4$	$y_2 = -3$

B(4 , –3)

Equation of medium $10x + y - 37 = 0$

3. ortho centre is A

$7x + 4y - 15 = 0$

$4x - 7y + 10 = 0$

$$\frac{x}{40-105} = \frac{y}{-60-70} = \frac{1}{-49-16}$$

$x = \frac{-65}{-65} \qquad y = \frac{-130}{-65}$

$x = 1 \qquad y = 2$

(1, 2)

4. $a[3x - 4y + 3] + 3x + 4y + 3 = 0$

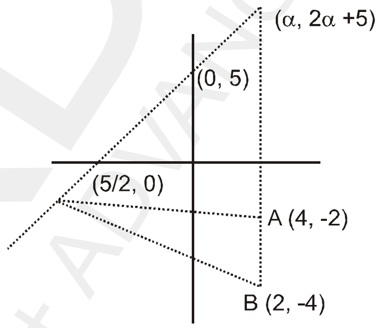
$L_1 + \lambda L_2 = 0$

$3x + 4y + 3 = 0$

$3x - 4y + 3 = 0$

point is $\equiv (-1, 0)$

5.



$$\begin{vmatrix} \alpha & 2\alpha+5 & 1 \\ 4 & -2 & 1 \\ 2 & -4 & 1 \end{vmatrix} = 0$$

$\alpha(2) - (2x + 5)(4 - 2) + (-16 + 4) = 0$

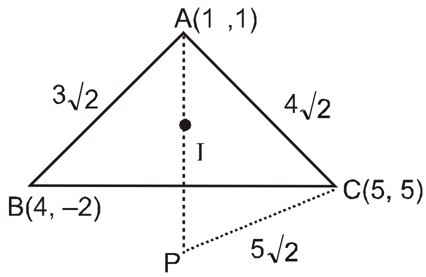
$2\alpha - 4\alpha - 10 - 12 = 0$

$-2\alpha - 22 = 0$

$\alpha \equiv 11$

points is $(-11, -17)$

6.



$AC \equiv \sqrt{2} \;\Rightarrow\; AB \equiv 3\sqrt{2} \;\Rightarrow\; BC \equiv 5\sqrt{2}$

$$I \equiv \left[\frac{5\sqrt{2}(1)+4\sqrt{2}(4)+3\sqrt{2}(5)}{5\sqrt{2}+4\sqrt{2}+3\sqrt{2}}, \frac{5\sqrt{2}(1)+4\sqrt{2}(-2)+3\sqrt{2}(5)}{5\sqrt{2}+4\sqrt{2}+3\sqrt{2}}\right]$$

$$\equiv \left[\frac{36}{12}, \frac{12}{12}\right] = (3, 1)$$

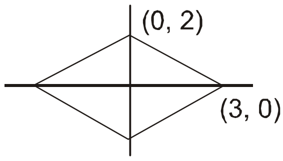
Slope of AI = 0

Slope of CP not defined

CP II to y-axis

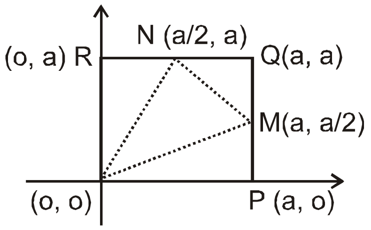
equation of CP $\equiv x = 5$

7. **(A)**



Area = $\left(\frac{1}{2}\times 2\times 3\right)\times 4 = 12$

(B)

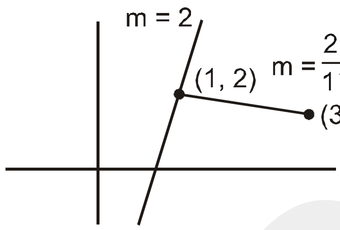


Area of square = a^2

Area of ΔOMN$=\frac{1}{2}\begin{vmatrix} a & a/2 & 1 \\ a/2 & a & 1 \\ 0 & 0 & 1 \end{vmatrix} = \frac{1}{2}\left|a^2 - \frac{a^2}{4}\right| = \frac{3a^2}{8}$

ratio 8 : 3 $\equiv$ l : 6 $\Rightarrow$ λ = 16

(C)



$m = \frac{2-1}{1-3} = -\frac{1}{2}$

m/6 = 2
m = 12

DPP NO. - 48

1. $\frac{3x+4y+7}{5} = \pm\left(\frac{4x-3y+1}{5}\right)$

+ve x – 7y – 6 = 0
-ve 7x + y + 8 = 0
closer to origin x – 7y – 6 = 0

2. gradient = – 2
(3x+4y+7) + λ(4x – 3y+1) = 0

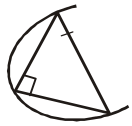
$-\frac{(3+4\lambda)}{(4-3\lambda)} = -2$

3 + 4λ = 8 – 6λ
10λ = 5
λ = 1/2
10x + 5y + 15 = 0 $\Rightarrow$ 2x + y + 3 = 0
y intercept = – 3

3. 4 – 3λ = 0 $\Rightarrow \lambda = \frac{4}{3}$

Equation line x + 1 = 0

4.



Let chord be ax + by = 1
homogenisng curne with the help of line.
$4x^2 + y^2 - x\,(ax+by) + 4y\,(ax + by) = 0$
Subtending right angle
4 – a + 1 + 4b = 0
a – 4b = 5

$\frac{a}{5} - \frac{4}{5}b = 1$

passing through $\left(\frac{1}{5} - \frac{4}{5}\right)$

5. x $\rightarrow$ – x
$ax^2 - 2h\,xy + by^2 = 0$

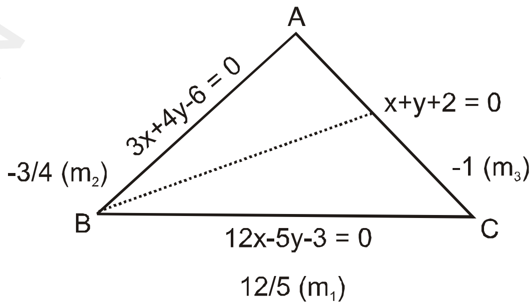
6. a = 12 b = 2 c = k f = $\frac{-5}{2}$ g = $\frac{11}{2}$ h = – 5

$abc + 2fgh - af^2 - bg^2 - ch| = 0$
(12) (2) (k) + 2 (–5/2) (11/2) (–5)

$-12\times\frac{25}{4} - 2\times\frac{121}{4} - k \times 25 = 0$

$\Rightarrow$ k = 2

7.



tan B = $\frac{m_1 - m_2}{1+m_1m_2} = \frac{\frac{12}{5}+\frac{3}{4}}{1-\frac{36}{20}}$ = -ve

Angle B is obtuse
$a_1a_2 + b_1b_2$ = 12 × 3 – 4 × 5 = + ve
+ve sign gives obtuse bisector

$\frac{3x+4y-c}{5} = +\frac{(12x-5y-3)}{13}$

39x + 52y – 78 = 60x - 25y – 15
21x – 77y + 63 = 0
3x – 11y + 9 = 0

DPP NO. - 49

1. Since 1 < 2 < 3 < 4
and 3 + 4 – 1 – 2 = 4 < 7
$\therefore$ the equation has two solutions

2. Since there are 2 solutions in the above question
$\therefore$ ℓ = 2

Since $2 < 3 < 4$ and $4 - 2 = 2 = \ell$

$\therefore$ the equation has one solution

3. Since the number of solutions in the above question is 1

$\therefore$ k = 1

$-1 < 0 < 1$ and follow

$k = 1 < 1 - (-1) = 2$

$\therefore$ the equation has no solution

4. $\begin{vmatrix} 2 & 1 & -3 \\ 5 & k & -3 \\ 3 & -1 & -2 \end{vmatrix} = 0$

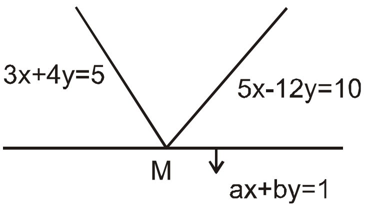
$2(-2k - 3) - (-10 + 9) - (-5 - 3k) = 0$

$-4k - 6 + 1 + 15 + 9k = 0$

$5k + 10 = 0$

$\Rightarrow k = -2$

5.



Equation of Angle bisector

$$\frac{3x+4y-5}{5} = \pm\left(\frac{5x-12y-10}{13}\right)$$

$14x + 112y - 15 = 0$

$14x + 112y = 15$

$$\frac{14}{15}x + \frac{112}{15}y = 1$$

$$a = \frac{14}{15} \quad b = \frac{112}{15}$$

–ve

$(39 + 25)x + (52 - 60)y - 65 - 50 = 0$

$64x - 8y = 115$

$$a = \frac{64}{115} \quad b = \frac{-8}{115}$$

6. $m_1 = \frac{2}{3}$

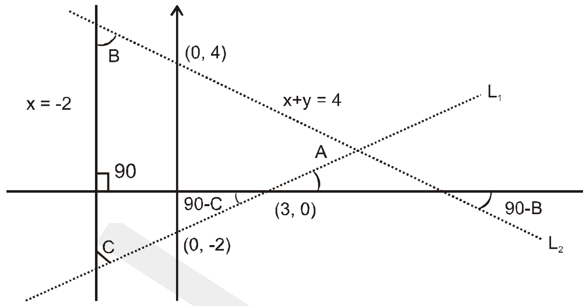
$m_2 = -1$

$m_3 = \infty$

$\pi - A + \alpha = \beta$

$A = \pi + \alpha - \beta$ ...

$$\tan A = \frac{\tan\alpha - \tan\beta}{1 + \tan\alpha\tan\beta} = \frac{\frac{2}{3} - (-1)}{1 - 2/3} = \frac{5}{1}$$



$\tan(B + 90) = -1$

$\cot B = 1$

$\tan B = 1$

$$\tan(90 - C) = \frac{2}{3}$$

$$\cot C = \frac{2}{3} \Rightarrow \tan C = \frac{3}{2}$$

$$x^3 - \left(5 + 1 + \frac{3}{2}\right)x^2 + \left(5 \times 1 + 1 \times \frac{3}{2} + \frac{3}{2} \times 5\right)x$$

$$- 5 \times 1 \times \frac{3}{2} = 0$$

$2x^3 - 15x^2 + 28x - 15 = 0$

DPP NO. - 50

1. here $2 > 1 > 0$ $\therefore$ 4 solutions

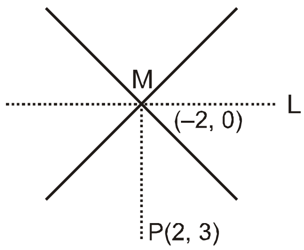
2. here $4 = m > 3 > 0$ $\therefore$ 2 solutions

3. here $\ell + 3 = 5 = 5 > 0$ $\therefore$ 3 solutions

4. $x + y + 2 = 0$

$3x + 4y + 6 = 0$

$$\frac{x}{6-8} = \frac{y}{6-6} = \frac{1}{4-3}$$



$x = -2$

$y = 0$

$$M_{PM} = \frac{3-0}{2+2} = 3/4$$

$$\text{slope of line L} = -\frac{4}{3}$$

Equation of line $y = -\frac{4}{3}(x + 2)$

$3y + 4x + 8 = 0$

5. $$\tan(90 - \alpha) = \frac{2-0}{8-x} = \frac{2}{8-x}$$

$$\cot\alpha = \frac{2}{8-x} \quad \text{............ (i)}$$

$\tan(90+\alpha) = \frac{y-0}{0-x} = \frac{-y}{x}$

$\cot\alpha = \frac{4-y}{3}$ .... (3)

$\frac{2}{8-x} = \frac{y}{x}$ $\quad\quad$ $\frac{y}{x} = \frac{4-y}{3}$

$2x = 8y - xy$ $\quad\quad$ $3y = 4x - xy$

$xy = 8y - 2x$ $\quad\quad$ $xy = 4x - 3y$

$\Rightarrow 8y - 2x = 4x - 3y$ $\quad\quad$ $\Rightarrow 11y = 6x$

$y = \frac{6x}{11} \quad \Rightarrow \quad x\left(\frac{6x}{11}\right) = 4x - 3\left(\frac{6x}{11}\right)$

$6x^2 = 44x - 18x$

$3x^2 = 22x - 9x$

$3x^2 = 13x$

$\Rightarrow x = 0 \quad$ or $\quad x = \frac{13}{3} = 4\frac{1}{3}$

6. **(A)** diagonal AC

$v_1v_3 - v_2v_4 = 0$

$(bx_1 + ay)(-ab) - ab(ax + by) + a^2b^2$

$= (bx + ay)(-2ab) + 2ab(ax + by) - 4a^2b^2 = 0$

$ab[-bx - ay - ax - by + 2bx + 2ay + 2ax + 2by] - 3a^2b^2 = 0$

$bx + ax + by + ay - 3ab = 0$

$x(a + b) + y(a + b) - 3ab = 0$

(B) true

(C) Diagonal BD

$v_2v_3 - v_1v_4 = 0$

$(ax + by - ab)(bx + ay - 2ab) - (bx + ay - ab)(ax + by - 2ab) = 0$

$(ax + by)(-2ab) - (bx + ay)(-ab) + 2a^2b^2 + 2ab(bx + ay) + ab(ax + by) = 0$

$x - y = 0$

so point of intersection $\equiv \left[\frac{3ab}{2(a+b)}, \frac{3ab}{2(a+b)}\right]$