GGSRDN

Educational Services Private Limited

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

अभ्यास ही सबसे बड़ा गुरू है।

CLASS : XI (MATHS)

DPP

DAILY PRACTICE PROBLEM

DPP-1 to 10

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 1

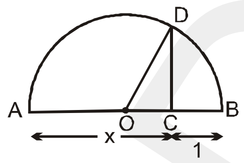
Total Marks : 24

Max. Time : 30 min.

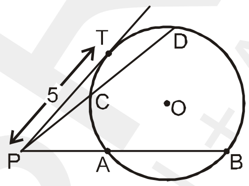
Topic : Fundamentals of Mathematics

Type of Questions		**M.M.,**	**Min.**
Subjective Questions (no negative marking) Q.1 to Q.6	**(4 marks, 5 min.)**	**[24,**	**30]**

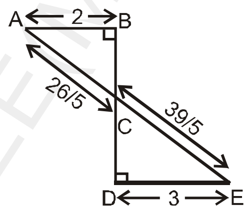
1. Find the value of CD in terms of x, in the adjoining figure, where O is the centre of semicircle.



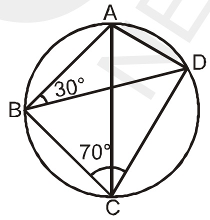
2. In the given figure (circle), PT = 5, PD = 7 and PA = 2, then the value of PB – PC = ?



3. In the adjoining figure find the value of BD.



4. Let ABCD is a cyclic quadrilateral. Then, find the $\angle$ADB.



5. Plot the straight lines on the co-ordinate axes.

(i) $y = x$ (ii) $y = -x$ (iii) $y = x + 1$

6. Convert into 'perfect square + some constant'.

(i) $x^2 + x$ (ii) $x^2 + 3x$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 2

Total Marks : 24

Max. Time : 30 min.

Topic : Fundamentals of Mathematics

Type of Questions		**M.M., Min.**
Single choice Objective ('–1' negative marking) Q.1,3,4,5,6	**(3 marks, 3 min.)**	**[15, 15]**
Fill in the Blanks (no negative marking) Q.2	**(4 marks, 4 min.)**	**[4, 4]**

1. A set of 'n' numbers has the sum 's'. Each number of the set is increased by 20, then multiplied by 5 and then decreased by 20. The sum of the numbers in the new set thus obtained is :

(A) s + 20 n
(B) 5s + 80n
(C) s
(D) 5s + 4n

2. The number $3.1\overline{45}$ when expressed as a rational number in lowest form, is equal to ______.

3. Consider the following statements

(i) The sum of a rational number with an irrational number is always irrational.
(ii) The product of two rational numbers is always rational.
(iii) The product of two irrationals is always irrationals.
(iv) The sum of two rational is always rational.
(v) The sum of two irrationals is always irrational.

The correct order of True/False of above statements is :

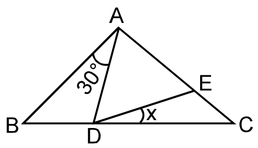
(A) T F T F F
(B) F F T T T
(C) T T F T F
(D) T T F F T

4. The expression $\left[\sqrt[3]{\sqrt[6]{a^9}}\right]^4 \left[\sqrt[6]{\sqrt[3]{a^9}}\right]^4$ is simplified to

(A) a^{16}
(B) a^{12}
(C) a^{8}
(D) a^{4}

5. In the figure, if AB = AC, $\angle$ BAD = 30° and AE = AD, then x is equal to

(A) 15°
(B) 10°
(C) 12½°
(D) 7½°



6. If $\dfrac{3+2\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$, then a & b (a, b $\in$ Q) are respectively equal to

(A) $\frac{13}{7}, \frac{9}{7}$
(B) $\frac{9}{7}, \frac{13}{7}$
(C) $\frac{13}{7}, \frac{7}{9}$
(D) $\frac{7}{9}, \frac{7}{13}$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 3

Total Marks : 34

Max. Time : 37 min.

Topics : Fundamentals of Mathematics, Complex number

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	(3 marks, 3 min.)	[3, 3]
True or False (no negative marking) Q.5	(2 marks, 2 min.)	[2, 2]
Fill in the Blanks (no negative marking) Q.6, 7	(4 marks, 4 min.)	[8, 8]
Subjective Questions (no negative marking) Q.8 to Q.10	(4 marks, 5 min.)	[12, 15]

COMPREHENSION (Q.No. 1 to 3)

Consider the number

N = 7 7 4 9 5 8 P 9 6 Q

1. If P = 2 and the number N is divisible by 3, then number of possible values of Q is/are

(A) 0 (B) 2 (C) 3 (D) 4

2. If N is divisible by 4, then

(A) P can be any integer and Q = 0, 2, 4, 6, 8
(B) P can be any rational number and Q = 0, 4, 8
(C) P can be any single digit whole number and Q = 0, 4, 8
(D) P can be any real number and Q = 0, 4, 8

3. If N is divisible by 8 and 9 both, then number of possible ordered pair (P, Q) is/are

(A) 3 (B) 2 (C) 1 (D) 0

4. A set of 'n' numbers has the sum 's'. Each number of the set is increased by 20, then multiplied by 5 and then decreased by 20. The sum of the numbers in the new set thus obtained is :

(A) s + 20 n (B) 5s + 80n (C) s (D) 5s + 4n

5. Consider the following statements

(i) The sum of a rational number with an irrational number is always irrational.
(ii) The product of two rational numbers is always rational.
(iii) The product of two irrationals is always irrationals.
(iv) The sum of two rational is always rational.
(v) The sum of two irrationals is always irrational.

The correct order of True/False of above statements is :

(A) T F T F F (B) F F T T T (C) T T F T F (D) T T F F T

6. The number $3.1\overline{45}$ when expressed as a rational number in lowest form, is equal to _______.

7. OABC is a rhombus whose three vertices A, B and C lie on a circle with centre O. If the radius of the circle is 10 cm, then area of rhombus is ....

8. Which is greater?

(i) $\sqrt[3]{3}$ or $\sqrt[4]{5}$ (ii) $\sqrt[8]{12}$ or $\sqrt[4]{6}$ (iii) $\sqrt{2}$ or $\sqrt[3]{3}$

9. Find real values of x and y for which the complex numbers $-3 + ix^2y$ and $x^2 + y + 4i$ are conjugate of each other.

10. Express the following in the form of a + ib

(i) $(1 + i)(1 + 2i)$ (ii) $\frac{3+2i}{-2+i}$ (iii) $\frac{1}{(2+i)^2}$

(iv) $\frac{(1+i)(1+\sqrt{3}\,i)}{1-i}$ (v) $\left(\frac{(1+2i)}{5}\right)^3$

MATHEMATICS DPP

DAILY PRACTICE PROBLEMS

DPP No. 4

Total Marks : 34

Max. Time : 36 min.

Topics : **Quadratic Equation, Fundamentals of Mathematics, Circle, Complex Number**

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]
Fill in the Blanks (no negative marking) Q.7, 8	(4 marks, 4 min.)	[8, 8]
Subjective Questions (no negative marking) Q.9, 10	(4 marks, 5 min.)	[8, 10]

COMPREHENSION (For Q.No. 1 to 3)

A polynomial P(x) of third degree vanish when $x = 1$ & $x = -2$. This polynomial have the values 4 & 28 when $x = -1$ and $x = 2$ respectively.

1. One of the factor of P(x) is
(A) $x + 1$ (B) $x - 2$ (C) $3x + 1$ (D) none of these

2. If the polynomial P(x) is divided by $(x + 3)$, the remainder is
(A) -32 (B) 100 (C) 32 (D) 0

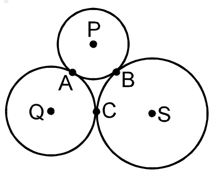
3. P(i), where $i = \sqrt{-1}$ is
(A) purely real (B) purely imaginary (C) imaginary (D) none of these

4. The value of x satisfying the equation $\frac{6x+2a+3b+c}{6x+2a-3b-c} = \frac{2x+6a+b+3c}{2x+6a-b-3c}$ is
(A) ab/c (B) 2ab/c (C) ab/3c (D) ab/2c

5. If $x = 3 - \sqrt{8}$, then $x^3 + \frac{1}{x^3}$ is equal to
(A) 6 (B) 198 (C) $6\sqrt{2}$ (D) 102

6. Which of these five numbers $\sqrt{\pi^2}$, $\sqrt[3]{0.8}$, $\sqrt[4]{0.00016}$, $\sqrt[3]{-1}$, $\sqrt{(0.09)^{-1}}$, is (are) rational :
(A) none (B) all (C) the first and fourth (D) only fourth and fifth

7. Circles with centres P, Q & S are touching each other externally as shown in the figure at points A, B & C . If the radii of circles with centres P, Q & S are 1, 2 and 3 respectively then the length of chord AB is _______



8. In a circle, chords AB and CD intersect at a point R inside the circle. If AR : RB = 1: 4 and CR: RD = 4: 9, then the ratio AB: CD is _______.

9. (i) Find the smallest positive integer 'n' for which $\left(\frac{1+i}{1-i}\right)^n = 1$

(ii) If $g(x) = x^4 - x^3 + x^2 + 3x - 5$, find $g(2 + 3i)$
(iii) Given that $x, y \in R$, solve
(a) $x^2 - y^2 - i(2x + y) = 2i$ (b) $(x + 2y) + i(2x - 3y) = 5 - 4i$

10. Find the real values of x & y for which $z_1 = 9y^2 - 4 - 10ix$ and $z_2 = 8y^2 - 20i$ are conjugate complex of each other.

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

MATHEMATICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 5

Total Marks : 40

Max. Time : 40 min.

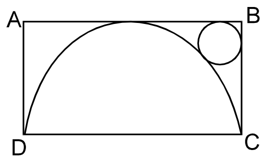
Topics : Fundamentals of Mathematics, Circle, Quadratic Equation

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1, 2, 3, 4, 5	(3 marks, 3 min.)	[15, 15]
Multiple choice objective (no negative marking) Q.6	(5 marks, 4 min.)	[5, 4]
Subjective Questions (no negative marking) Q.7	(4 marks, 5 min.)	[4, 5]
Fill in the Blanks (no negative marking) Q.8, 9	(4 marks, 4 min.)	[8, 8]
Match the Following (no negative marking) Q.10	(8 marks, 8 min.)	[8, 8]

1. If $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is a polynomial such that when it is divided by $(x - 1)$ and $(x + 1)$ the remainders are 5 and 19 respectively. If $f(x)$ is divided by $(x - 2)$, then remainder is :

(A) 0 (B) 5 (C) 10 (D) 2

2. The figure shows a rectangle ABCD with a semi-circle and a circle inscribed inside it as shown. What is the ratio of the area of the circle to that of the semi-circle?



(A) $(\sqrt{2}-1)^2$

(B) $2(\sqrt{2}-1)^2$

(C) $(\sqrt{2}-1)^2/2$

(D) None of these

3. A 3-digit number has, from left to right, the digits a, b and c with a>c. When the number with the digits reversed is subtracted from the original number, the unit's digit in the difference is 4. The next two digits, from right to left, are

(A) 5 and 9 (B) 9 and 5 (C) 5 and 4 (D) 4 and 5

4. The cubic polynomial P(x) satisfies the condition that $(x - 1)^2$ is a factor of P(x) + 2, and $(x + 1)^2$ is a factor of P(x) – 2.Then P(3) equals.

(A) 27 (B) 18 (C) 12 (D) 6

5. If $a + b + c = 0$ & $a^2 + b^2 + c^2 = 1$ then the value of $a^4 + b^4 + c^4$ is

(A) 1 (B) 4 (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

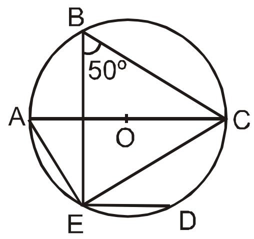
6. The equation $\frac{2x^3-3x^2+x+1}{2x^3-3x^2-x-1} = \frac{3x^3-x^2+5x-13}{3x^3-x^2-5x+13}$ has

(A) at least one real solution (B) exactly three real solution

(C) exactly one irrational solution (D) complex roots

7. If $x + y + z = 1$, $x^2 + y^2 + z^2 = 2$ and $x^3 + y^3 + z^3 = 3$. Find value of $x \cdot y \cdot z$.

8. In the given figure the chord ED is parallel to the diameter AC of the circle with centre O, then ∠CED is equal to ....



9. If the number A 3 6 4 0 5 4 8 9 8 1 2 7 0 6 4 4 B is divisible by 99 then the ordered pair of digits (A, B) is _______ .

10. Match the following

Column – I		**Column – II**	
(A)	Even number	(p)	$\frac{22}{7}$
(B)	Rational number	(q)	π
(C)	Irrational number	(r)	0
(D)	Real number	(s)	$\sqrt{2}$
		(t)	$1.2\overline{34}$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 6

Total Marks : 40

Max. Time : 50 min.

Topic : Fundamentals of Mathematics

Type of Questions		M.M., Min.
Short Subjective Questions (no negative marking) Q.1 to Q.10	(4 marks, 5 min.)	[40, 50]

1. $\frac{x^2-5x+6}{x^2+x+1} < 0.$

2. $\frac{x^2+4x+4}{2x^2-x-1} > 0.$

3. $\frac{5x-1}{x^2+3} < 1$

4. $\frac{x^4+x^2+1}{x^2-4x-5} < 0$

5. $\frac{x^2-1}{x^2+x+1} < 1$

6. $\frac{x^2-1}{2x+5} < 3$

7. $2 + \frac{3}{x+1} > \frac{2}{x}$

8. $\frac{x-1}{x} - \frac{x+1}{x-1} < 2$

9. $\frac{(x-1)(x-2)(x-3)}{(x+1)(x+2)(x+3)} > 1$

10. $\frac{(x-4)^{2005}.(x+8)^{2008}(x+1)}{x^{2006}(x-2)^3.(x+3)^5.(x-6)(x+9)^{2010}} \le 0$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 7

Total Marks : 26

Max. Time : 26 min.

Topics : Fundamentals of Mathematics, Quadratic Equation

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1 to 7	(3 marks, 3 min.)	[9, 9]
Short Subjective Questions (no negative marking) Q.8	(4 marks, 5 min.)	[4, 5]
Multiple choice objective (no negative marking) Q.9	(5 marks, 4 min.)	[5, 4]
Match the Following (no negative marking) Q.10	(8 marks, 8 min.)	[8, 8]

1. The solution set of the equation $|2x + 3| - |x - 1| = 6$ is

(A) $x \in (-10, 2)$ (B) $x \in [-10, 2)$ (C) $x \in [-10, 2]$ (D) $x \in \{-10, 2\}$

2. Value of x satisfying $\left|\frac{x}{|x|}\right| = \frac{x}{|x|}$ is/are

(A) $x \in R$ (B) $x \in R - \{0\}$ (C) $x \in R^+$ (D) $x \in R^-$

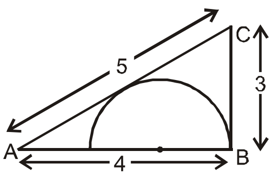
3. Number of positive integers x for which $f(x) = x^3 - 8x^2 + 20x - 13$, is a prime number, is

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

4. The product of all the solutions of the equation $(x-2)^2 - 3|x - 2| + 2 = 0$ is

(A) 2 (B) – 4 (C) 0 (D) none of these

5. In the figure shown, radius of the circle is



(A) $\frac{5}{8}$ (B) $\frac{3}{2}$

(C) $\frac{11}{8}$ (D) $\frac{5}{3}$

6. Draw the graphs of

(i) $y = |x + 2| + |x - 3|$ (ii) $y = x + \frac{x}{|x|}$

7. Draw graph of

(i) $y = |3x - 5|$ (ii) $y = |2x + 1|$

8. $1 < \frac{3x^2 - 7x + 8}{x^2 + 1} \le 2$

9. If p, q $\in$ N satisfy the equation $x^{\sqrt{x}} = (\sqrt{x})^x$, then p and q are

(A) relatively prime (B) twin prime

(C) coprime (D) if $\log_q p$ is defined then $\log_p q$ is not an vice versa

10. **Match the column**

Column – I		Column – II	
(A)	Solution set of $|x - 2| \ge 0$	(p)	$x \in \phi$
(B)	Solution set of $|x - 2| > 0$	(q)	$x \in (-\infty, \infty)$
(C)	Solution set of $|x - 2| < 0$	(r)	$x = 2$
(D)	Solution set of $|x - 2| \le 0$	(s)	$x \in (-\infty, \infty) - \{2\}$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 8

Total Marks : 40

Max. Time : 50 min.

Topic : Fundamentals of Mathematics

Type of Questions		**M.M., Min.**
Short Subjective Questions (no negative marking) Q.1 to 10	**(4 marks, 5 min.)**	**[40, 50]**

1. $\dfrac{x^2-7|x|+10}{x^2-6x+9} < 0$

2. $\dfrac{|x+3|+x}{x+2} > 1$

3. $\dfrac{|x+2|-x}{x} < 2$

4. $\dfrac{1}{|x|-3} < \dfrac{1}{2}$

5. $|x| - |x-2| \geq 1$

6. $|x^3 - 1| \geq 1 - x$

7. $\left|x^2 - 4x + 4\right| \geq 1$

8. $\left|\dfrac{3x}{x^2-4}\right| \leq 1$

9. $\left|\dfrac{x^2-5x+4}{x^2-4}\right| \leq 1$

10. $\dfrac{|x-3|}{x^2-5x+6} \geq 2$

MATHEMATICS

DPP
DAILY PRACTICE PROBLEMS

DPP No. 9

Total Marks : 30

Max. Time : 34 min.

Topic : Fundamentals of Mathematics

Type of Questions		M.M.,	Min.
Comprehension (no negative marking) Q.1 to 3	(3 marks, 3 min.)	[9,	9]
Single choice Objective (no negative marking) Q.4	(3 marks, 3 min.)	[3,	3]
True or False (no negative marking) Q.5	(2 marks, 2 min.)	[2,	2]
Subjective Questions (no negative marking) Q.6,7,8,9	(4 marks, 5 min.)	[16,	20]

COMPREHENSION (Q.No. 1 to 3)

Consider the equation $2^{|x+1|} - 2^x = |2^x - 1| + 1$

1. The least value of x satisfying the equation is
(A) 0 (B) 2 (C) 4 (D) none of these

2. Number of integers less than 15 satisfying the equation are
(A) 14 (B) 15 (C) 16 (D) none of these

3. Number of composite numbers less than 20 which are coprime with 4 satisfying the given equation is/ are
(A) 2 (B) 3 (C) 4 (D) 5

4. If the solution of the equation $|(x^4-9) - (x^2+3)| = |x^4 - 9| - |x^2 + 3|$ is $(-\infty, p] \cup [q, \infty)$ then value of p + q is
(A) 0 (B) 4 (C) 1 (D) –1

5. State whether the following statements are **True** or **False**

(i) If $\frac{1}{|a|} > \frac{1}{b}$, then $|a| < b$, where a & b are non-zero real numbers.

(ii) If $\frac{1}{a} > \frac{1}{|b|}$, then $a < |b|$, where a & b are non-zero real numbers.

6. Simplify : $\frac{x}{x-y} - \frac{y}{x+y} - \frac{2xy}{x^2-y^2}$

7. Solve the following equations
(i) $|x| + 2|x - 6| = 12$
(ii) $||x + 3| - 5| = 2$
(iii) $|||x - 2| - 2| - 2| = 2$

8. Let $f(x) = |x - 2| + |x - 4| - |2x - 6|$, then find the sum of the largest and smallest values of f(x) if $x \in [2,8]$.

9. Draw the labelled graph of following
(i) $y = |7 - 2x|$
(ii) $y = |x - 1| - |3x - 2|$
(iii) $y = |x - 1| + |x - 4| + |x - 7|$

MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 10

Total Marks : 35

Max. Time : 38 min.

Topics : Fundamentals of Mathematics, Quadratic Equation

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.6,7,8	**(4 marks, 5 min.)**	**[12, 15]**
Match the Following (no negative marking) Q.9	**(8 marks, 8 min.)**	**[8, 8]**

1. The set of all values of 'x' which satisfies the inequation $\left|1-\frac{|x|}{1+|x|}\right| \ge \frac{1}{2}$ is :

(A) $[-1, 1]$ (B) $(-\infty, -1]$ (C) $[1, \infty)$ (D) $(0, 1)$

2. The quadratic equation $x^2 - 9x + 3 = 0$ has roots α and β. If $x^2 - bx - c = 0$ has roots α^2 and β^2, then (b, c) is

(A) (75, –9) (B) (–75, 9) (C) (– 87, 4) (D) (–87, 9)

3. If the difference of the roots of the equation $x^2 + px + q = 0$ be unity, then $(p^2 + 4q^2)$ is equal to

(A) $(1 + 2q)^2$ (B) $(1 - 2q)^2$ (C) $4(p - q)^2$ (D) $2(p - q)^2$

4. The number of integral value(s) of x satisfying the equation $|x^4.3^{|x-2|}.5^{x-1}| = -x^4.3^{|x-2|}.5^{x-1}$ is

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

5. If p & q are distinct reals , then

$2\{(x-p)(x-q) + (p-x)(p-q) + (q-x)(q-p)\} = (p-q)^2 + (x-p)^2 + (x-q)^2$

is satisfied by :

(A) no value of 'x' (B) exactly one value of 'x'

(C) exactly two values of 'x' (D) infinite values of 'x'

6. If α, β are the roots of the equation $x^2 - 2x + 3 = 0$ then find the equation whose roots are $\alpha^3 - 3\alpha^2 + 5\alpha - 2$ and $\beta^3 - \beta^2 + \beta + 5$.

7. Solve the equation : $\left|\frac{x^2-8x+12}{x^2-10x+21}\right| = \frac{-(x^2-8x+12)}{x^2-10x+21}$

8. Find the set of values of x satisfying the equation $x^2.2^{x+1} + 2^{|x-3|+2} = x^2 2^{|x-3|+4} + 2^{x-1}$

9. **Match the column**

If α, β are the roots of the equation $x^2 - 4x + 1 = 0$, then

Column – I		**Column – II**	
(A)	$\alpha^2 + \beta^2$	(p)	52
(B)	$\alpha^3 + \beta^3$	(q)	4
(C)	$\|\alpha - \beta\|$	(r)	14
(D)	$\frac{1}{\alpha} + \frac{1}{\beta}$	(s)	$2\sqrt{3}$

DPP 1 TO 10 (ANSWER KEY)

DPP NO. - 1

1. $\sqrt{x}$ **2.** $\frac{125}{14}$ **3.** 12 **4.** 40°

DPP NO. - 2

1. (B) **2.** 173/55 **3.** (C) **4.** (D)

5. (A) **6.** (A)

DPP NO. - 3

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

5. (C) **6.** 173/55 **7.** $50\sqrt{3}$ sq. cm.

8. (i) $\sqrt[4]{5}$ (ii) $\sqrt[4]{6}$ (iii) $\sqrt[3]{3}$

9. x = 1, y = – 4; x = –1, y = – 4

10. (i) –1 + 3i (ii) $-\frac{4}{5}-\frac{7}{5}i$ (iii) $\frac{3}{25}-\frac{4}{25}i$

(iv) $-\sqrt{3}+i$ (v) $-\frac{11}{125}-\frac{2}{125}i$

DPP NO. - 4

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

5. (B) **6.** (D) **7.** $\sqrt{2}$ **8.** 15: 13

9. (i) 4 (ii) –(77 + 108i)

(iii) (a) $x=-2, -\frac{2}{3}$, $y = 2, -\frac{2}{3}$ (b) x = 1, y = 2

10. (–2, 2); (–2, –2)

DPP NO. - 5

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

5. (C) **6.** (A, B, D)o **7.** 1/6

8. 40° **9.** (9, 1)

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

DPP NO. - 6

1. (2, 3) **2.** $(-\frac{n}{k}, -2) \cup (-2, -1/2) \cup (1, +\infty)$

3. $(-\infty, 1) \cup (4, +\infty)$ **4.** (–1, 5) **5.** $(-2, +\infty)$

6. $(-\infty, -5/2) \cup (-2, 8)$

7. $(-\infty, -2) \cup (-1, 0) \cup (1/2, +\infty)$

8. $(-\infty, -1) \cup (0, 1/2) \cup (1, +\infty)$

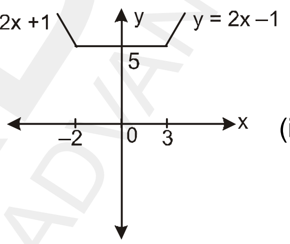
9. $(-\infty, -3) \cup (-2, -1)$

10. $x \in (-\infty, -9) \cup (-9, -3) \cup [-1, 0) \cup (0, 2) \cup [4, 6)$

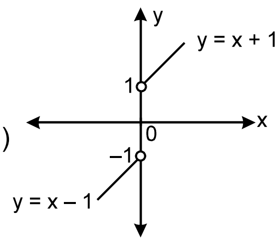
DPP NO. - 7

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

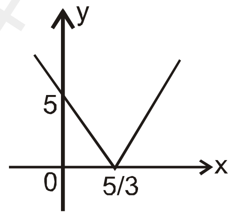
6.(i)



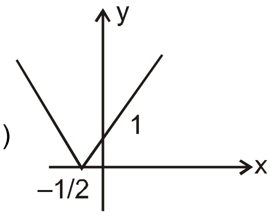
(ii)



7. (i)



(ii)



8. [1, 6]

9. (ACD)

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

DPP NO. - 8

1. $(-5, -2) \cup (2, 3) \cup (3, 5)$ **2.** $(-5, -2) \cup (-1, +\infty)$

3. $(-\infty, 0) \cup (1, +\infty)$

4. $(-\infty, -5) \cup (-3, 3) \cup (5, \infty)$ **5.** $x \in \left[\frac{3}{2}, \infty\right)$

6. $x \in (-\infty, -1] \cup [0, \infty)$ **7.** $x \in (-\infty, 1] \cup [3, \infty)$

8. $(-\infty, -4] \cup [-1, 1] \cup [4, +\infty)$

9. $[0, 8/5] \cup [5/2, +\infty)$ **10.** [3/2, 2)

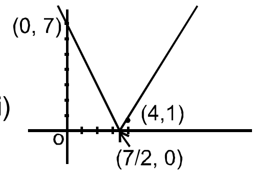
DPP NO. - 9

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

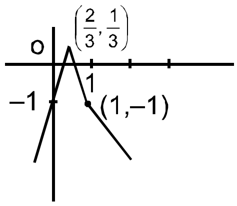
5. (i) False (ii) True **6.** $\frac{x-y}{x+y}$

7. (i) $x = 0, 8$ (ii) $x = -10, -6, 0, 4$
(iii) $x = 0, \pm 4, 8$ **8.** 2

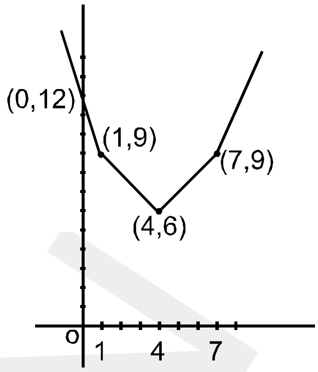
9. (i)



(ii)



(iii)



DPP NO. - 10

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

6. $x^2 - 3x + 2 = 0$ **7.** $x \in [2, 3) \cup [6, 7)$

8. $x \in [3, \infty) \cup \{-1/2, 1/2\}$

9. (A) $\to$ (r), (B) $\to$ (p), (C) $\to$ (s), (D) $\to$ (q)

GGSRDN

Educational Services Private Limited

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

अभ्यास ही सबसे बड़ा गुरू है।

CLASS : XI (MATHS)

DPP

DAILY PRACTICE PROBLEM

Solutions

DPP-1 to 10

DPP 1 TO 10 (SOLUTIONS)

DPP NO. - 1

1. Diameter AB = x + 1

Radius OD = $\frac{x+1}{2}$

$OC = OB - BC = \frac{x+1}{2} - 1 = \frac{x-1}{2}$

$\therefore$ $CD = \sqrt{OD^2 - OC^2}$ (Pythagorus theorem)

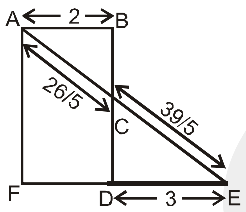
$\Rightarrow CD = \sqrt{\left(\frac{x+1}{2}\right)^2 - \left(\frac{x-1}{2}\right)^2} = \sqrt{x}$

2. We know that
$PT^2 = PA.\ PB = PC.\ PD$

$5^2 = 2.\ PB = PC.\ 7 \Rightarrow PB = \frac{25}{2}$ and $PC = \frac{25}{7}$

$\therefore$ $PB - PC = \frac{125}{14}$

3. $AE = \frac{26+39}{5} = 13$



FE = 5

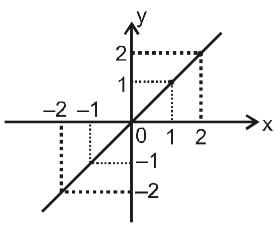
$\therefore$ $AF = \sqrt{AE^2 - FE^2} = \sqrt{13^2 - 5^2} = 12$

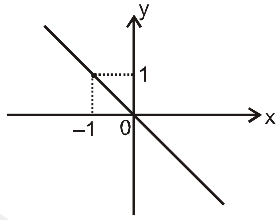
4. Since ABCD is a cyclic quadrilateral
$\therefore$ $\angle BAD = 180° - \angle BCD = 110°$
$\therefore$ $\angle ADB = 180° - (30° + 110°) = 40°$

5. To plot a straight line on co-ordinate axes we need only two co-ordinate

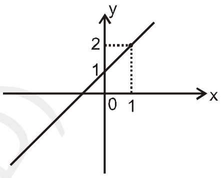
(i) y = x
x = 0, y = 0
x = 1, y = 1

(ii) y = – x
x = 0, y = 0
x = –1, y = + 1





(iii) y = x + 1
x = 0, y = 1
x = 1, y = 2



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

(ii) $\left(x^2 + 3x + \frac{9}{4}\right) - \frac{9}{4} = \left(x + \frac{3}{2}\right)^2 - \frac{9}{4}$

DPP NO. - 2

1. Sum $s = a_1 + a_2 + ... + a_n$
Sum of numbers in the new set
$= (5(a_1 + 20) - 20) + (5(a_2 + 20) - 20).....$
$+ (5(a_n + 20) - 20) = 5s + 80n$

2. $p = 3.1\overline{45} = 3.145454545..........$
p = 3.1454545..........
10p = 31.454545..........(1)
100 × 10p = 3145.4545..........
1000p = 3145.4545..........(2)
(2) – (1)
990p = 3145 – 31 = 3114

$p = \frac{3114}{990}$

$p = \frac{173}{55}$

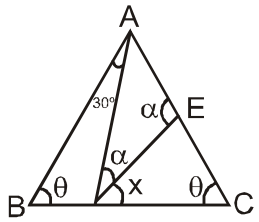
3. (i) Sum of a rational number with an irrational number is always irrational (T)

Ex. $1 + F_2 = Q^C$
$\downarrow \quad \downarrow$
$Q \quad Q^C$

(ii) T
(iii) F $\rightarrow F_2 \times (-F_2) = -2$ (rational)
(iv) T
(v) F $\rightarrow F_2 + (-F_2) = 0$ (rational)
TTFTF $\rightarrow$ (C) is correct option.

4. $a^{9/6\ .\ 4/3}\ .\ a^{9/3\ .\ 4/6} = a^4$

5. $\alpha = x + \theta$ ($\angle AED = \angle EDC + \angle ECD$)
$\alpha + x = 30 + \theta$ ($\angle ADC = \angle ABD + \angle BAD$), (external angle)



Solving the two equations, we get x = 15º

6. rationalise L.H.S. and compare with R.H.S

DPP NO. - 3

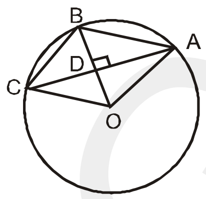
1. Sum of digits = 57 + Q
$\therefore$ Q = {0, 3, 6, 9}

2. 6Q shoud be divisible by 4
$\therefore$ Q = 0, 4, 8 & P can take values from 0 to 9

3. 96Q should be divisible by 8, Q = 0, 8
sum of digits = 55 + P + Q, Sum should be divisible by 9
for Q = 0 ; P = 8
Q = 8, P = 0, 9

4. Sum s = $a_1 + a_2 + ...+ a_n$
Sum of numbers in the new set
$= (5(a_1 + 20) – 20) + (5(a_2 + 20) – 20).....$
$+ (5(a_n + 20) – 20) = 5s + 80n$

7. Area of rhombus = $\frac{1}{2}$(product of diagonals)
d_1 = OB = 10
OB = 10 $\Rightarrow$ OD = 5 ;
in ΔAOD AD = $5\sqrt{3}$ (by pythagorean triplet)



$\therefore$ d_2 = AC = $10\sqrt{3}$
area = $50\sqrt{3}$

8. (i) $\sqrt[3]{3}$ or $\sqrt[4]{5}$
$\left(\sqrt[3]{3}\right)^{12}$ or $\left(\sqrt[4]{5}\right)^{12}$
$\Rightarrow$ 3^4 or 5^3
$\therefore$ 5^3 is greater $\Rightarrow$ $\sqrt[4]{5}$ is greater
(ii) 12 or 6^2
6^2 is greater $\Rightarrow$ $\sqrt[4]{6}$ is greater
(iii) 2^3 or 3^2
3^2 is greater $\Rightarrow$ $\sqrt[3]{3}$ is greater

9. $– 3 – ix^2 y = x^2 + y + 4i$
$x^2 + y = – 3$; $x^2y = – 4$
solving, we get x = ± 1, y = – 4

10. (iv) $\frac{(1+i)(1+\sqrt{3}i)}{1-i} = \frac{(1+i)^2(1+\sqrt{3}i)}{(1+i)(1-i)}$

$= \frac{2i(1+\sqrt{3}i)}{2} = -\sqrt{3} + i$

DPP NO. - 4

1. P(x) = (x – 1) (x + 2) (ax + b)
P(–1) = 4 $\Rightarrow$ – 2 (b – a) = 4 $\Rightarrow$ a – b = 2
P(2) = 28 $\Rightarrow$ 4(2a + b) = 28 $\Rightarrow$ 2a + b = 7
on solving a = 3, b = 1

2. Remainder = P(–3) = –32

3. P(i) = (i – 1) (i + 2) (3i + 1) = imaginary

4. Applying C and D both sides, and solve

5. $x^3 + \frac{1}{x^3} = (3 - \sqrt{8})^3 + (3 + \sqrt{8})^3$
Applying $a^3 + b^3 = (a + b)(a^2 + b^2 – ab)$

6. (1) $\sqrt{\pi^2} = \pi$ irrational

(2) $\sqrt[3]{0.8} = \left(\frac{4}{3}\right)^{1/3}$ irrational

(3) $\sqrt[4]{0.00016} = \left(\frac{0.00016}{10}\times 10\right)^{1/4}$
$= ((0.000016) \times 10)^{1/4} = ((0.2)^4 \times 10)^{1/4}$
$= (0.2)(10)^{1/4} = \frac{2}{10}\times(10)^{1/4}$
$= \frac{2}{(10)^{3/4}}$ irrational

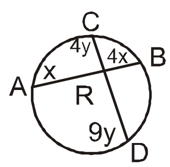
(4) $\sqrt[3]{-1} = (–1)^{1/3} = –1$ rational

(5) $\sqrt{(0.09)^{-1}} = \frac{1}{\sqrt{0.09}} = \frac{1}{0.3} = \frac{10}{3}$ rational

$\Rightarrow$ Only fourth and fifthe are rational.

7. ΔPQS is right angled at P, (Since PQ = 3, PS = 4, QS = 5)
In ΔPAB , AB = $\sqrt{2}$

8. AR . RB = CR . RD
So, $4x^2 = 9y^2$
$\Rightarrow$ x = 3y
Now, AB : CD = 5x : 13y = 15 : 13



9. **(i)** $\left(\frac{1+i}{1-i}\right)^n = 1$

$\frac{1+i}{1-i}\times\frac{1+i}{1+i} = \frac{2t}{2} = i$

$i^n = 1$

$n = 4$

(ii) $g(x) = x^4 - x^3 + x^2 + 3x - 5$

$x = 2 + 3i$

$x - 2 = 3i$

squaring $x^2 - 4x + 13 = 0$

$x^2(x^2 - 4x + 13 + 4x - 13) - x^3 + x^2 + 3x - 5$

$= 4x^3 - 13x^2 - x^3 + x^2 + 3x - 5$

$= 3x^3 - 12x^2 + 3x - 5$

$= 3x\,[x^2 - 4x + 13 + 4x - 13] - 12x^2 + 3x - 5$

$= 12x^2 - 39x - 12x^2 + 3x - 5 - 36x - 5$

$= -36\,(2+3i) - 5$

$= -77 - 108i$

(iii) $x^2 - y^2 - i\,(2x + y) = 2i$

(a) $x^2 - y^2 = 0$

$x = \pm y$

$2x + y = -2$

$2x + x = -2 \Rightarrow 3x = -2 \Rightarrow x = \frac{-2}{3}$

$y = 2, -2/3$

$2x - x = -2$

$x = -2$

(b) $(x+2y) + i(2x-3y) = 5 - 4i$

$x + 2y = 5$ & $2x - 3y = -4$

Solving $x = 1$, $y = 2$

10. $\vec{z}_1 = 9y^2 - 4 + 10\,i\,x$ and $z^2 = 8y^2 - 20i$

$\Rightarrow x = -2$ & $9y^2 - 4 = 8y^2$ $\Rightarrow y = \pm 2$

DPP NO. - 5

1. $P(1) = 5 \Rightarrow 2 - a + b = 5$

$\Rightarrow b - a = 3$ ......(i)

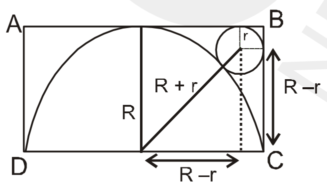
$P(-1) = 6 + a + b = 19 \Rightarrow b + a = 13$ ....(ii)

solving (i) and (ii)

$b = 8, a = 5$

$= P(2) = 10.$

2. $\therefore$ $R + r = \sqrt{2}\,(R - r)$



$\Rightarrow r = (\sqrt{2}-1)\frac{R}{(\sqrt{2}+1)} = (\sqrt{2}-1)^2 R$

so ratio of area of circle to that of semi-circle is

$= \pi r^2 : \frac{\pi R^2}{2} = 2(\sqrt{2}-1)^4$

3. N = abc (let) ; a > c

New number N' = cba

Difference of digits at unit place = 4

$\Rightarrow 10 + c - a = 4$

$\Rightarrow a - c = 6$

then middle digit = 9 and first digit = a – 1 – c = 5

$\therefore$ then difference is 594

4. $P(x) + 2 = (ax + b)\,(x - 1)^2$ .....(i)

$P(x) - 2 = (cx + d)\,(x + 1)^2$ .....(ii)

equating P(x) from (i) and (ii) and comparing coefficients of all powers of 'x'

$(ax + b)(x^2 - 2x + 1) - 2 = (cx + d)(x^2 + 2x + 1) + 2$

coeff. of x^3 : $a = c$

coeff. of x^2 : $-2a + b = 2c + d$ .....(ii)

coeff. of x : $a - 2b = 2d + c$....(iii)

const : $b - 2 = d + 2 \Rightarrow b = d + 4$ ......(iv)

by (iii) and (iv) $-2b = 2d$ ($\because a = c$)

and, $b = 2$, $d = -2$ and by (i), $a = c = 1$

$\therefore$ $P(x) = (x + 2)\,(x^2 - 2x + 1) - 2$ .....(i)

so, $P(3) = 5(9 - 6 + 1) - 2 = 18$

5. $a + b + c = 0$

$a^2 + b^2 + c^2 = 1$

$a^4 + b^4 + c^4 = (a^2 + b^2 + c^2)^2 - 2(a^2b^2 + b^2c^2 + c^2a^2)$

$= 1 - 2(a^2b^2 + b^2c^2 + c^2a^2)$ .....(1)

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$0 = 1 + 2(ab + bc + ca)$

$\Rightarrow ab + bc + ca = \frac{-1}{2}$

$(ab + bc + ca)^2 = a^2b^2 + b^2c^2 + c^2a^2 + 2(ab^2c + 2abc^2 + 2bca^2)$

$\frac{1}{4} = (a^2b^2 + b^2c^2 + c^2a^2) + 2abc(a + b + c)$

$a^2b^2 + b^2c^2 + c^2a^2 = \frac{1}{4}$ Put in (1), we get

$a^4 + b^4 + c^4 = 1 - 2 \times \frac{1}{4} = 1 - \frac{1}{2} = \frac{1}{2}$

$a^4 + b^4 + c^4 = \frac{1}{2}$

6. Apply C & D, and solve

7. $x + y + z = 1$

$x^2 + y^2 + z^2 = 2$

$x^3 + y^3 + z^3 = 3$

$\because$ $x^3 + y^3 + z^3$

$= 3xyz + (x + y + z)\,(x^2 + y^2 + z^2 + xy + yz + zx)$

$3 = 3xyz + (2 + xy + yz + zx)$

$1 = 3xyz + (ay + yz + zx)$ .....(1)

$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$

$1 = 2 + 2(xy + yz + zx)$

$-\frac{1}{2} = xy + yz + zx$

Put the value in (1)

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

$1 + \frac{1}{2} = 2xyz$

$\frac{3}{2} = 3xyz$

$xyz = \frac{1}{2}$

8. $\angle AEC = 90°$
$\angle CAE = \angle EBC = 50°$ (angle in same segment)
$\therefore \angle ACE = 40° = \angle CED$

9. $99 = 11 \times 9$
k = A 3 6 4 0 5 4 8 9 8 1 2 7 0 6 4 4 B
k must be divisible by 9 and 11
$S_o - S_E = (B + 4 + 0 + 2 + 8 + 8 + 5 + 4 + 3)$
$- (4 + 6 + 7 + 1 + 9 + 4 + 0 + 6 + A) = (B + 34)$
$- (37 + A)$
$S_o - S_E = B - A - 3 = 11$ multiple of 11
$\Rightarrow B - A - 3$ multiple of 11
$BA = -8, 3$
Sum of digits = 71 + A + B = multiple of 9
A + B = 10

Case-I $B - A = -8$
$A + B = 10$

$2B = 2$

Case-II $B - A = 3$
$A + B = 1$
$2B = 13$
$B = 13/2$
Not possible

B = 1 ; A = 9
$\Rightarrow$ Order pair of (A, B) $\equiv$ (9, 1)

10. (A) Even number = 0 $\Rightarrow$ r

(B) Rational number = $\frac{22}{7}$, 0, $\left(1.2\overline{34} = \frac{611}{495}\right)$

$\Rightarrow$ p, r, t

(C) Irrational number = π, $\sqrt{2}$ $\Rightarrow$ q, s

(D) Real number = $\frac{22}{7}$, π, 0, $\sqrt{2}$, $1.2\overline{34}$

$\Rightarrow$ p, q, r, s, t

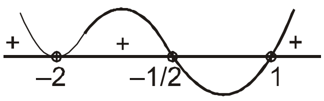
DPP NO. - 6

1. $\frac{x^2 - 5x + 6}{x^2 + x + 1} < 0$

$\because x^2 + x + 1 > 0 \ \forall x \in R$
so $x^2 - 5x + 6 < 0$
$x^2 - 3x - 2x + 6 < 0$
$x(x - 3) - 2(x - 3) < 0$
$(x - 2)(x - 3) < 0$
$2 < x < 3$

2. $\frac{x^2 + 4x + 4}{2x^2 - x - 1} > 0$

$\frac{(x+2)^2}{2x^2 - 2x + x - 1} > 0$



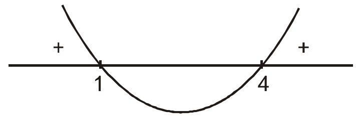
$\frac{(x+2)}{2x(x-1)+1(x-1)} > 0$

$\frac{(x+2)^2}{(2x+1)(x-1)} > 0$

$x \in (-\infty, -2) \cup (-2, -1/2) \cup (1, +\infty)$

3. $\frac{5x - 1}{x^2 + 3} - 1 < 0$

$\frac{-x^2 - 3 + 5x - 1}{x^2 + 3} < 0$



$x^2 - 5x + 4 > 0$
$x^2 - 4x - x + 4 > 0$
$(x - 1)(x - 4) > 0$
$x \in (-\infty, 1) \cup (4, +\infty)$

4. $\frac{x^4 + x^2 + 1}{x^2 - 4x - 5} < 0$ $x^4 + a^2 + 1 > 0 \ \forall x \in R$

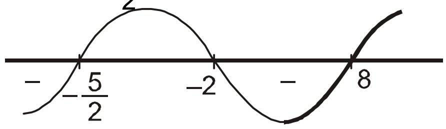
so $\frac{1}{x^2 - 4x - 5} < 0 \Rightarrow x^2 - 4x - 5 < 0$
$x^2 - 5x + x - 5 < 0$
$x(x - 5) + 1(x + 1) < 0$
$-1 < n < 5$

5. $\frac{x^2 - 1}{x^2 + x + 1} - 1 < 0 \Rightarrow \frac{x^2 - 1 - x^2 - n - 1}{x^2 + x + 1} < 0$
$\because x^2 + x + 1 > 0 \ \forall x \in R$
$-x - 2 < 0$
$x + 2 > 0 \Rightarrow x > -2 \Rightarrow x \in (-2, +\infty)$

6. $\frac{x^2 - 1}{2x + 5} - 3 < 0 \Rightarrow \frac{x^2 - 1 - 6x - 15}{2x + 5} < 0 \Rightarrow$

$\frac{x^2 - 6x - 16}{2x + 5} < 0 \Rightarrow \frac{x^2 - 8x + 2x - 16}{\left(x + \frac{5}{2}\right)} < 0 \Rightarrow$

$\frac{x(x-8) + 2(x-8)}{x + \frac{5}{2}} < 0 \Rightarrow \frac{(x-8)(x-2)}{x + \frac{5}{2}} < 0$



$x \in (-\infty, -5/2) \cup (-2, 8)$

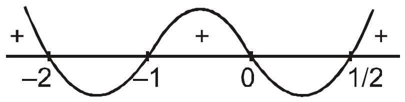
7. $2 + \frac{3}{x+1} > \frac{2}{x} \Rightarrow \frac{2}{x} - \frac{3}{x+1} < 2$

$\Rightarrow \frac{2x + 2 - 3x}{x^2 + x} - 2 < 0$

$\Rightarrow \frac{2 - x - 2x^2 - 2x}{x(x+1)} < 0$

$\Rightarrow \frac{-2x^2 - 3x + 2}{x(x-1)} < 0 \Rightarrow \frac{2x^2 + 3x - 2}{x(x+1)} > 0 \Rightarrow$

$\frac{2x^2 + 4x - x - 2}{x(x+1)} > 0 \Rightarrow \frac{2x(x+2) - 1(x-2)}{x(x+1)} > 0$



$\Rightarrow \dfrac{(2x-1)(x+2)}{x(x+1)} > 0$

$x \in (-\infty, -2) \cup (-1, 0) \cup (1/2, +\infty)$

8. $\dfrac{x-1}{x} - \dfrac{x+1}{x-1} < 2$

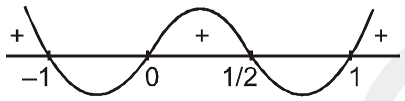
$\dfrac{x^2+1-2x-x^2-x}{x(x-1)} - 2 < 0$

$\Rightarrow \dfrac{1-3x-2x^2+2x}{x(x-1)} < 0 \Rightarrow \dfrac{-2x^2-x+1}{x(x-1)} < 0$

$\Rightarrow \dfrac{2x^2+x-1}{x(x-1)} > 0 \quad \Rightarrow \dfrac{2x^2+2x-x-1}{x(x-1)} > 0 \Rightarrow$

$\dfrac{2x(x+1)-1(x+1)}{x(x-1)} > 0$

$\Rightarrow \dfrac{(2x-1)(x+1)}{x(x-1)} > 0$

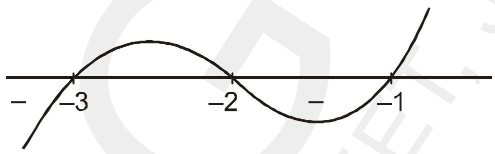


$x \in (-\infty, -1) \cup (0, 1/2) \cup (1, +\infty)$

9. $\dfrac{(x-1)(x-2)(x-3)}{(x+1)(x+2)(x+3)} - 1 > 0$

$\dfrac{x^3-6x^2+11x-6-x^3-6x^2-11x-6}{(x+1)(x+2)(x+3)} > 0$

$\dfrac{-12x^2-12}{(x+1)(x+2)(x+3)} > 0$



$\dfrac{x^2+1}{(x+1)(x+2)(x+3)} < 0$

$\Rightarrow (x + 1)(x + 2)(x + 3) < 0$

$x \in (-\infty, -3) \cup (-2, -1)$

10. $\dfrac{(x-4)^{2005}.(x+8)^{2008}\,(x+1)}{x^{2006}(x-2)^3\,.(x+3)^5\,.(x-6)\,(x+9)^{2010}}$

$x \in (-\infty, -9) \cup (-9, -8] \cup [-8, -3)$
$\cup [-1, 0) \cup (0, 2) \cup [4, 6)$

$x \in (-\infty, -9) \cup (-9, -3) \cup [-1, 0) \cup (0, 2) \cup [4, 6)$

DPP NO. - 7

1. **Case-I :**

$x \geq 1$

$2x + 3 - x + 1 = 6 \Rightarrow x = 2$

Case-II :

$-\dfrac{3}{2} \leq x < 1$

$2x + 3 + x - 1 = 6 \Rightarrow x = \dfrac{4}{3}$ (Not possible)

Case-III :

$x < -\dfrac{3}{2}$

$-2x - 3 + x - 1 = 6 \quad \Rightarrow x = -10$

$\therefore x \in \{-10, 2\}$

2. $\left|\dfrac{x}{|x|}\right| = \dfrac{x}{|x|}$; $x \neq 0$

and $\dfrac{x}{|x|}$ should be positive

$\Rightarrow x > 0$ or $x \in R^+$

3. $x^3 - 8x^2 + 20x - 13 = (x - 1)(x^2 - 7x + 13)$ is prime

so, either $x - 1 = 1$

$\Rightarrow x = 2$

or $x^2 - 7x + 13 = 1$

$\Rightarrow x = 3, 4$

$\therefore$ number of positive integers x = 3 i.e. {2, 3, 4}.

4. $(x - 2)^2 - 3|x - 2| + 2 = 0$

$|x - 2| = 1, 2$

$|x - 2| = 1 \Rightarrow x = 1, 3$

$|x - 2| = 2 \Rightarrow x = 0, 4$

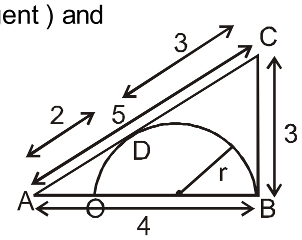
product of solutions = 0

5. BC = CD (length of tangent) and

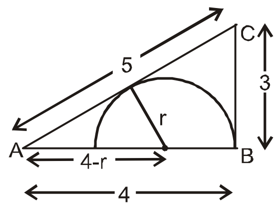
$AD^2 = AO . AB$

$4 = 4 . (4 - 2r)$

$r = \dfrac{3}{2}$



IInd Method



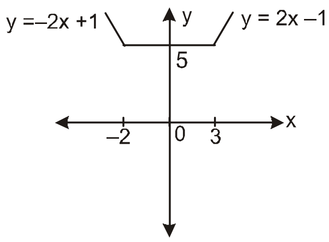
$\sin A = \dfrac{r}{4-r} = \dfrac{3}{5}$

$\Rightarrow \quad r = \dfrac{3}{2}$

6. (i) $y = |x + 2| + |x - 3|$

Case-I $x \geq 3$
$y = 2x - 1$

Case-II $-2 \leq x < 3$



$y = 5$

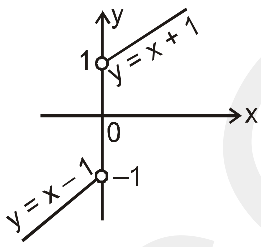
Case-III $x < -2$
$y = -2x + 1$

(ii) $y = x + \dfrac{x}{|x|}$

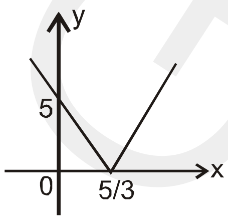
Case-I $x > 0$
$y = x + 1$

Case-II $x < 0$
$y = x - 1$

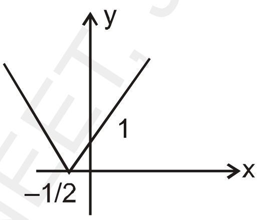
Case-III $x = 0$ (not possible)



7. (i)



(ii)



8. $1 < \dfrac{3x^2 - 7x + 8}{x^2 + 1} \leq 2$

$\Rightarrow \dfrac{3x^2 - 7x + 8}{x^2 + 1} > 1$

and $\dfrac{3x^2 - 7x + 8}{x^2 + 1} \leq 2$

$\dfrac{3x^2 - 7x + 8 - x^2 - 1}{x^2 + 1} > 0$

$\dfrac{3x^2 - 7x + 8 - 2x^2 - 2}{x^2 + 1} \leq 0$

$\dfrac{2x^2 - 7x + 7}{x^2 + 1} > 0$ $\qquad x^2 - 7x + 6 \leq 0$

$2x^2 - 7x + 7 > 0$ $\qquad x^2 - 6x - x + 6 \leq 0$

$D = 49 - 4x\,2x\,7 < 0$ $\qquad x(x - 6) + (x - 6) \leq 0$

$\Rightarrow 2x^2 - 7x + 7 > 0 \quad \forall x \in R$ .....(1)

$(x - 1)(x - 6) \leq 0$

$1 \leq n \leq 6$ ....(2)

(1) $\cap$ (2), we get

$1 \leq n \leq 6$

$x \in [1, 6]$

9. $p, q \in N \qquad x^{\sqrt{x}} = (\sqrt{x})^x$ ......(1)

for 1st to be held $n > 0$

Case-I When $n = 1$

for $n = 1$ equation is true

Case-II When $x \neq 1, n > 0$

taken log to the base x of equation (1)

$\sqrt{x} = x \, . \, \log_x^{\sqrt{x}} = \dfrac{n}{2}.\log_x^{\alpha}$

$\sqrt{x} = \dfrac{x}{2} \Rightarrow x = \dfrac{x^2}{4} \Rightarrow x = 4$

from case (I) and (II) two solution of equation (1) are x = 1, 4 which are coprime if p = 4, q = 1, then $\log_p q$ is not difined

if p = 1, q = 4, then $\log_q p$ is difined, by $\dfrac{q}{p}$ is not defined.

10. (A) $|x - 2| \geq 0 \quad \forall x \in R$

(B) $|x - 2| > 0 \quad \forall x \in R - \{2\} \quad x \in (-\infty, \infty) - \{2\}$

(C) $|x - 2| < 0 \quad x \in \phi$

(D) $|x - 2| \leq 0$

$\because \; |x - 2| \not< 0$ so $|x - 2| = 0 \Rightarrow x = 2$ is the solution.

DPP NO. - 8

1. $\dfrac{x^2 - 7|x| + 10}{x^2 - 6x + 9} < 0$

$\dfrac{x^2 - 7|x| + 10}{(x - 3)^2} < 0$

$|x|^2 - 7|x| + 10 < 0 \quad x \neq 3 \quad \{x^2 = |x|^2\}$

$|x|^2 - 7|x| + 10 < 0$

$|x|^2 - 5|x| - 2(x) + 10 < 0$

$|x|(|x| - 5) - 2(|x| - 5) < 0$

$(|x| - 2)(|x| - 5) < 0$

$2 < |x| < 5$

$\Rightarrow 2 < n < 5$ or $-5 < n < -2$

$\Rightarrow x \in (-5, -2) \cup (2, 5)$ and $x \neq 3$

$\Rightarrow x \in (-5, -2) \cup (2, 3) \cup (3, 5)$

4. $\dfrac{1}{|x| - 3} - \dfrac{1}{2} < 0 \quad \Rightarrow \quad \dfrac{2 - |x| + 3}{|x| - 3} < 0$

$\dfrac{5 - |x|}{|x| - 3} < 0 \quad \Rightarrow \quad \dfrac{|x| - 5}{|x| - 3} > 0$

$\Rightarrow$ $|x| > 5$ or $|x| < 3$

$\Rightarrow$ $(x > 5$ or $x < -5)$ or $(-3 < x < 3)$

$x \in (-\infty, -5) \cup (5, \infty)$ or $(-3 < x < 3$

$\Rightarrow$ $x \in (-\infty, -5) \cup (-3, 3) \cup (5, \infty)$

5. $|x| - |x - 2| \geq 1$

$|x| \geq 1 + |x - 2|$ squaring on both side

$x^2 \geq 1 + (x - 2)^2 + 2(x - 2)$

$x^2 \geq 1 + x^2 + 4 - 4x + 2|x - 2|$

$0 \geq 5 - 4x + 2|x - 2|$

$4x - 2|x - 2| \geq 5$

Case-I : $x \geq 2$

$4x - 2x + 4 \geq 5$

$2x \geq 1 \Rightarrow x \geq \frac{1}{2}$

$\Rightarrow x \geq 2$ and $x \geq \frac{1}{2} \Rightarrow n \in (2, \infty)$ .....(1)

Case-II : $x < 2$

$4x + 2x - 4 \geq 5$

$6x \geq 9$

$x \geq \frac{3}{2} \Rightarrow \frac{3}{2} \leq n < 2$ .....(2)

Takint union of (1) and (2)

$x \in \left[\frac{3}{2}, \infty\right)$

6. $|x^3 - 1| \geq 1 - x$

$|(x - 1)(x^2 + 1 + x)| \geq (1 - n)$

$(x^2 + x + 1)|x - 1| > (1 - x)$ .....(1)

Case-I : x = 1 equation (1) is true

so x = 1 is a solution of 1st

Case-II : n > 1

$(x^2 + x + 1)(x - 1) \geq -(x - 1)$

$x^2 + x + 2 \geq 0 \ \forall\ x \in R$

$\Rightarrow$ x > 1 is a solution

Case-III : x < 1

$\Rightarrow (x^2 + x + 1)(1 - x) \geq 1 - x$

$x^2 + x + 1 \geq 1$

$x^2 + x \geq 0$

$a(x + 1) \geq 0$

$x \geq 0$ or $x \leq 1$ and $x < 1$

$\Rightarrow x \in (-\infty, -1] \cup [0, 1)$

From case I, II, III we get

$x \in (-\infty, -1] \cup (0, 1) \cup \{1\} \cup [1, \infty)$

$x \in (-\infty, -1] \cup [0, \infty)$

7. $\left|x^2 - 4x + 4\right| \geq 1 \Rightarrow \left|(x-2)^2\right| \geq 1 \Rightarrow (x - 2)^2 \geq 1$

$\left|x - 2\right| \geq 1$ or $x - 2 \leq -1$

$x \geq 3$ or $x \leq 1$

$x \in (-\infty, 1] \cup [3, \infty)$

8. $\left|\frac{3x}{x^2 - 4}\right| \leq 1$ and $x \neq \pm 2$

$3|x| \leq |x^2 - 4|$

square on both side

$9x^2 \leq x^4 + 16 - 8x^2$

$x^4 - 17x^2 + 16 \geq 0$

$x^2(x^2 - 16) - 1(x^2 - 16) \geq 0$

$(x^2 - 1)(x^2 - 16) \geq 0$

$x^2 \geq 16$ or $x^2 \leq 1$

$|x| \geq 4$ or $|x| \leq 1$

$x \in (-\infty, -4] \cup [4, \infty)$ or $-1 \leq n \leq 1$

$x \in (-\infty, -4] \cup [-1, 1] \cup [4, \infty)$

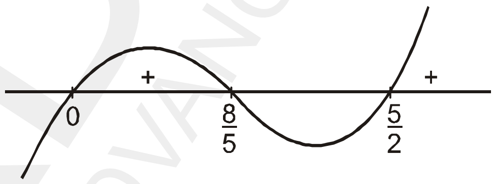
9. $\left|\frac{x^2 - 5x + 4}{x^2 - 4}\right| \leq 1$ and $x \neq \pm 2$

$\left|x^2 - 5x + 4\right| \leq \left|x^2 - 4\right|$ given both step

$(x^2 - 5x + 4)^2 \leq (x^2 - 4)^2$

$(x^2 - 5x + 4 - x^2 + 4)(x^2 - 5x + 4 + x^2 - 4) \leq 0$

$(x - 5x)(2x - 5x) \leq 0$



$(5x - 8)(2x^2 - 5x) \geq 0$

$x(5x - 8)(2x - 5) \geq 0$

$[0, 8/5] \cup [5/2, +\infty)$

10. Since $x^2 - 5x + 6 = (x - 2)(x - 3)$, for $x > 3$ the given inequality is equivalent to the inequality $1/(x - 2) \geq 2$, and for $x < 3$ it is equivalent to the inequality $1/(2 - x) \geq 2$.

DPP NO. - 9

1. $2^{|x+1|} - 2^x = |2^x - 1| + 1$

Case-I :

$x \geq 0$

$2^{x+1} - 2^x = 2^x$ holds for all $x \geq 0$.

Case-II :

$-1 \leq x < 0$

$2^{x+1} - 2^x = 2 - 2^x \Rightarrow 2^{x+1} = 2$

$\therefore$ x = 0 (not possible)

Case-III :

$x < -1$

$2^{-x-1} - 2^x = 2 - 2^x \Rightarrow -x - 1 = 1 \Rightarrow x = -2$

$\therefore$ least value of 'x' is – 2

2. Number of integers less than 15 = 16

i.e. {–2, 0, 1, ..., 14 }

3. Composite numbers less than 20, coprime with 4 = 2

i.e. { 9, 15 }

4. We have $|a - b| = |a| - |b|$ if a , b have the same sign and $|a| \geq |b|$

i.e. $x^4 - 9$ and $x^2 + 3$ must be of same sign

i.e. $(x^4 - 9)(x^2 + 3) > 0 \Rightarrow (x^2 - 3)(x^2 + 3)^2 > 0 \Rightarrow$

$x^2 - 3 > 0$ ...(1)

and $|x^4 - 9| \geq |x^2 + 3|$

i.e. $(x^2 - 3)(x^2 + 3) \geq x^2 + 3$

[using result (1)]

i.e. $(x^2 + 3)(x^2 - 4) \geq 0 \Rightarrow x^2 \geq 4$, gives

$x \in (-\infty,-2) \cup [2, \infty)$.

5. $\frac{1}{|a|} > \frac{1}{b}$, then $|a| < b$

If b = –ve this is not true

Hence false

$\frac{1}{a} > \frac{1}{|b|}$, then $a < |b|$

Here a is always +ve because $\frac{1}{a} > \frac{1}{|b|}$

Hence $|b| > a$ **True**

6. $\frac{x^2 + xy - xy + y^2 - 2xy}{x^2 - y^2} = \frac{(x-y)^2}{(x+y)(x-y)} = \frac{x-y}{x+y}$

7. **(1)** $|x| + 2|x - 6| = 12$

Case-I : $x \geq 6$ $3x = 24 \Rightarrow x = 8$

Case-II : $0 \leq x < 6$

$x + 12 - 2x = 12 \Rightarrow x = 0$

Case-III : $x < 0$

$-x + 12 - 2x = 12 \Rightarrow x = 0$

so solution is x = 0, 8

(2) $||x + 3| - 5| = 2$

$\Rightarrow |x + 3| - 5 = 2, -2$ $\Rightarrow |x + 3| = 7$ or $|x + 3| = 3$

$\Rightarrow x + 3 = 7, -7$ or $x + 3 = 3, -3$

$\Rightarrow x = 4, -10$ or $x = 0, -6$

so x = –10, –6, 0, 4

(3) $|||x - 2| - 2| - 2| = 2 \Rightarrow ||x - 2| - 2| - 2 = \pm 2$

either $||x - 2| - 2| = 4$ or 0

case-I : $||x - 2| - 2| = 4$

$|x - 2| - 2 = \pm 4 \Rightarrow |x - 2| = 6$ or $-2 \Rightarrow x - 2 = \pm 6$

$\Rightarrow$ x = 8 or –4

case-II : $||x - 2| - 2| = 0$

$|x - 2| - 2 = 0 \Rightarrow |x - 2| = 2 \Rightarrow x - 2 = \pm 2$

$\Rightarrow$ x = 4 or 0

hence four solutions : 0, –4, 4 & 8

8. If $2 \leq x \leq 3$, $f(x) = x - 2 + 4 - x - (6 - 2x)$

$\Rightarrow$ $f(x) = 2x - 4$,

hence minimum = 0, maximum = 2

If $3 \leq x \leq 4$, $f(x) = x - 2 + 4 - x - (2x - 6)$

$\Rightarrow f(x) = 8 - 2x$,

hence minimum = 0, maximum = 2

If $4 \leq x \leq 8$, $f(x) = x - 2 + x - 4 - (2x - 6) = 0$

$\because$ minimum = 0, maximum = 0

Finally, minimum = 0, maximum = 2

$\therefore$ Their sum is equal to 2.

DPP NO. - 10

1. $\left|1 - \frac{|x|}{1+|x|}\right| \geq \frac{1}{2}$

$1 - \frac{|x|}{1+|x|} \geq \frac{1}{2}$

$1 - \frac{|x|}{1+|x|} \geq \frac{1}{2}$ or $1 - \frac{|x|}{1+|x|} \leq \frac{-1}{2}$

$\frac{|x|}{1+|x|} \leq \frac{1}{2}$ or $\frac{|x|}{1+|x|} \geq \frac{3}{2}$

$2|x| \leq 1 + |x|$ or $2|x| \geq 3 + 3|x|$

$|x| \leq 1$ or $|x| + 3 \leq 0$ not possible

$\Rightarrow x \in \phi$

$-1 \leq n \leq 1$ or $x \in \phi$

$\Rightarrow$ $x \in [-1, 1]$

2. $\alpha + \beta = 9$, $\alpha\beta = 3$

$\alpha^2 + \beta^2 = b$, $\alpha^2\beta^2 = -c$

$81 - 2 \times 3 = b$, $\Rightarrow 9 = -c$

b = 75, c = –9 7

3. $\alpha - \beta = 1$

$p^2 - 4q = 1$

$p^2 - 4q + 4q^2 = 1 + 4q^2$

$p^2 + 4q^2 = (1 + 2q)^2$

4. $|x^4.3^{|x-2|}.5^{x-1}| = -x^4 3^{|x-2|}.5^{x-1}$

$\Rightarrow$ $x^4.3^{|x-2|}.5^{x-1} = 0$ $\Rightarrow$ $x^4 = 0$

so x = 0

5. $2\{(x - p)(x - q) + (p - q)(p - x - q + x\} = (p - q)^2 + (x - p)^2 + (x - q)^2$

$\Rightarrow 2(x - p)(x - q) + (p - q)^2 = (x - p)^2 + (x - q)^2$

$\Rightarrow 2x^2 - 2x(p + q) + 2pq + p^2 + q^2 - 2pq = 2x^2 + p^2 + q^2 - 2x(p + q)$

It is an identity so infinite values of x are possible.

6. $\alpha^2 - 2\alpha + 3 = 0$ and $\beta^2 - 2\beta + 3 = 0$

now $\alpha^3 - 3\alpha^2 + 5\alpha - 2$

$= \alpha(\alpha^2 - 3\alpha + 5) - 2 = \alpha(-3 - \alpha + 5) - 2$

$= 2\alpha - \alpha^2 - 2 = 3 - 2 = 1$ and $\beta^3 - \beta^2 + \beta + 5$

$= \beta(\beta^2 - \beta + 1) + 5 = \beta(2\beta - 3 - \beta + 1) + 5$

$= \beta^2 - 2\beta + 5 = 2$

$\therefore$ equation $x^2 - 3x + 2 = 0$

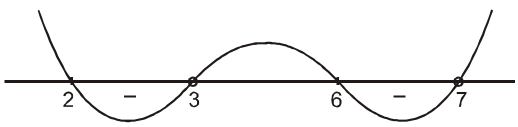
7. $\left|\frac{x^2 - 8x + 12}{x^2 - 10x + 21}\right| = \frac{-(x^2 - 8x + 12)}{x^2 - 10x + 21}$ ....(1)

for equation (1) to be hold

$\frac{x^2 - 8x + 12}{x^2 - 10x + 21} \leq 0$

$\frac{(x^2 - 6x - 2x + 12)}{x^2 - 7x - 3x + 21} \leq 0$

$\Rightarrow$ $\frac{x(x - 6) - 2(x - 6)}{x(x - 7) - 3x - 7} \leq 0$



$\frac{(x - 2)(x - 6)}{(x - b)(x - 7)} \leq 0$

$x \in [2, 3) \cup [6, 7)$

8. $x^2.2^{x+1} + 2^{|x-3|+2} = x^2\, 2^{|x-3|+4} + 2^{x-1}$ ......(1)

Case-I : $x \geq 3$

$x^2 - 2^{x+1} + 2^{x-1} = x^2 . 2^{|x-3|+4} + 2^{x-1}$

$1 = 1$ true

so 1^{st} is hold $\forall\, x \geq 3$

$x \in [3, \infty)$ ....(2)

Case-II : $x^2 - 2^{x+1} + 2^{5-x} = x^2 . 2^{7-x} + 2^{x-1}$

$x^2(2^{x+1} - 2^{7-x}) = 2^{x-1} - 2^{5-x}$

$x^2 . 2^{7-x}(2^{2x-6} - 1) = 2^{5-x}(2^{2x-6} - 1)$

$x^2.2^2(2^{2x-6} - 1) = (2^{2x-6} - 1)$

$\because$ $x < 3$ so $2^{2x-6} - 1 \neq 0$

$4x^2 = 1$

$x = \pm \frac{1}{2}$

Req. solution is : $x \in [3, \infty) \cup \{-1/2, 1/2\}$

9. $\alpha + \beta = 4$, $\alpha\beta = 1$

(A) $\alpha^2 + \beta^2 = 16 - 2 = 14$

(B) $\alpha^3 + \beta^3 = (\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta)$

$= 64 - 3 \times 1 \times 4 = 52$

(C) $|\alpha - \beta| = \sqrt{16-4} = 2\sqrt{3}$

(D) $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \frac{4}{1} = 4$