MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 27

Total Marks : 24

Max. Time : 30 min.

Topic : Fundamentals of Mathematics

Type of Questions		**M.M., Min.**
Subjective Questions (no negative marking) Q.1,2,3,4,5,6	**(4 marks, 5 min.)**	**[24, 30]**

1. If [x] denotes greatest integer $\leq$ x and {x} denotes fractional part of x then evaluate / simpilfy the folowing :

(i) $\left|\sqrt{7-4\sqrt{3}}\right|$ (ii) $\left|\pi-3-\sqrt{8-2\sqrt{15}}\right|$

(iii) $[|\, e^2 - \pi^2 \,|]$ (iv) $\{|\, \pi - e + 1 \,|\}$

(v) $\left|\sqrt[3]{2}-\sqrt[4]{3}\right|$

2. Make the following expressions free from modulus sign : ($x \in R$)

(i) $|\, x^2 - x + 3 \,|$ (ii) $|\, 2x - x^2 - 3 \,|$

(iii) $|\, x + 1 \,|$ if $x > -\frac{1}{2}$

3. Make the following expressions free from modulus sign : ($x \in R$)

(i) $|\, x^2 - 3x - 4 \,|$ (ii) $|\, x^2 - 7x + 10 \,|$ if $x < 5$

(iii) $|\, x + 2 \,| + |\, x - 2 \,|$ if $x^2 \leq 2$ (iv) $|\, x^3 + 8 \,|$

(v) $|\, x + 3 \,| + |\, x \,| + |\, x - 1 \,|$

4. Draw graph of the following expressions. Also find extremum value if it exists.

(i) $y = |\, x - 2 \,| + |\, x - 1 \,| + |\, x + 1 \,| + |\, x + 2 \,|$

(ii) $y = |\, 2x - 5 \,| - 2 |\, 2x + 5 \,|$

(iii) $y = |\, 2x - 1 \,| + |\, x - 1 \,|$

(iv) $y = |\, x - 1 \,| - |\, x - 6 \,|$

5. Solve the following equations :

(i) $|\, x - 3 \,| = x - 1$ (ii) $|\, x^2 - 3x \,| = 2x - 6$

(iii) $|\, x - 4 \,| + |\, x - 7 \,| = 11$

6. Solve the following equations :

(i) $|\, x^2 - 2 \,| = 2 |\, x - 3 \,|$ (ii) $|\, x^2 - 4 \,| + |\, x^2 - 9 \,| = 0$

(iii) $|\, x - 1 \,| + |\, x + 5 \,| = 6$

Answers Key

1. (i) $2-\sqrt{3}$ (ii) $-\pi+3+\sqrt{5}-\sqrt{3}$ (iii) 2

(iv) $\pi-e$ (v) $\sqrt[4]{3}-\sqrt[3]{2}$ 2. (i) x^2-x+3

(ii) x^2-2x+3 (iii) $x+1$

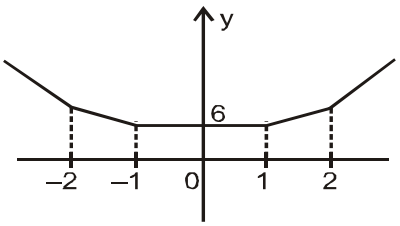
3. (i) $\begin{cases} -(x^2-3x-4) \text{ if } x\in(-1,4) \\ x^2-3x-4 \text{ if } x\in(-\infty,-1]\cup[4,\infty) \end{cases}$

(ii) $\begin{cases} (x^2-7x+10) & \text{if} \quad x\le 2 \\ -(x^2-7x+10) & \text{if} \quad 2<x<5 \end{cases}$ (iii) 4

(iv) $\begin{cases} -(x^3+8) \text{ if } x<-2 \\ (x^3+8) \text{ if } x\ge -2 \end{cases}$

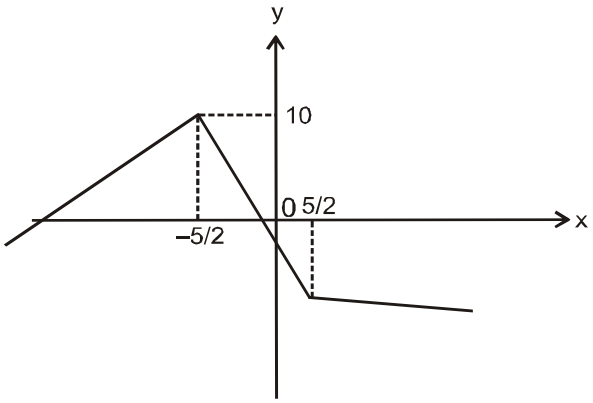
(v) $\begin{cases} -3x-2 & , \quad x<-3 \\ -x+4 & , \quad -3\le x<0 \\ x+4 & , \quad 0\le x<1 \\ 3x+2 & , \quad x\ge 1 \end{cases}$

4. (i)



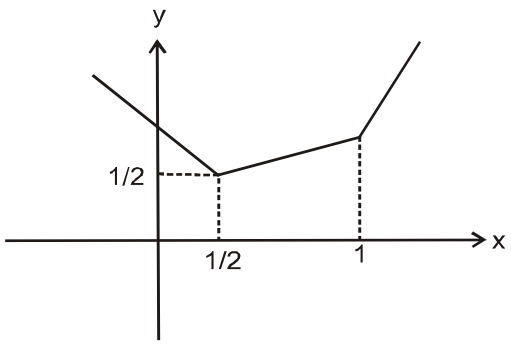
, Min value = 6

(ii) $y=\begin{cases} 2x+15 & , \quad x<-\frac{5}{2} \\ -6x-5 & , \quad -\frac{5}{2}\le x<\frac{5}{2} \\ -2x-15 & , \quad x\ge\frac{5}{2} \end{cases}$



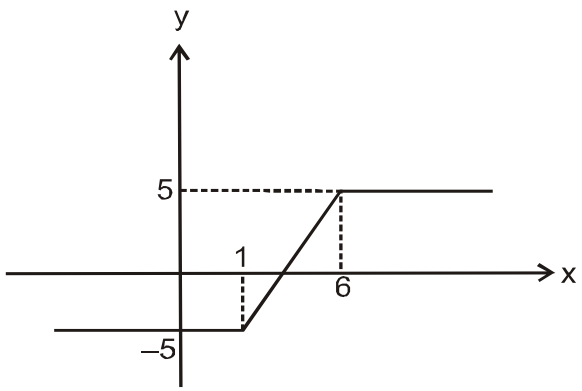
Max. value = 10

(iii) $y = \begin{cases} -3x+2 & , \quad x < \frac{1}{2} \\ x & , \quad \frac{1}{2} \le x < 1 \\ 3x-2 & , \quad x \ge 1 \end{cases}$



Min value = $\frac{1}{2}$

(iv) $y = \begin{cases} -5 & , \quad x < 1 \\ 2x-7 & , \quad 1 \le x < 6 \\ 5 & , \quad x \ge 6 \end{cases}$



Min value = – 5
Max. value = 5

5. (i) x = 2 (ii) x = 3 (iii) x = 0, 11

6. (i) x = – 4, 2 (ii) No solution (iii) $x \in [-5, 1]$