شهرزاد شوشتری

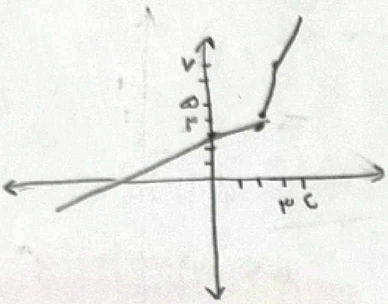
کلاسینگ ۸

۱)

$f(x)=\sqrt{1-x^2} \to 1-x^2 \geq 0 \to x^2 \leq 1 \to -1 \leq x \leq 1$ $\begin{cases} x=1 \to 0 \\ x=0 \to 1 \\ x=-1 \to 0 \end{cases}$

$2g-3f=\{(-1,2)(0,5)(1,4)\}$ $R=\{2,5,4\}$ $5+4+2=11$

۲)



$f(x)=2x-1 \to x=3 \to 6-1=5$

$2x-1 \to x=4 \to 8-1=7$ $\Big\}$ $R_f=[5,+\infty)$

$g(x)=\frac{1}{3}x+3 \to x=3 \to 1+3=4$

$x=0 \to 0+3=3$ $R_g=(-\infty,4]$

$R_f \cup R_g=(-\infty,4] \cup [5,+\infty)$

۳)

$-\frac{x^2}{2}+x+3 \geq \frac{3}{2} \xrightarrow{\times 2} -x^2+2x+6 \geq 3 \to -x^2+2x+3 \geq 0 \to$

$x^2+2x-3=0=(x+3)(x-1)$ $\begin{array}{c|c|c} & -1 & 3 \\ \hline + & - & + \end{array} \to a=-1$

$\sqrt{3-(-1)}=\sqrt{4}=2$

۴)

$y=|x-1|+|x-3|+|2x-4|$

$\downarrow$ 1 $\quad \downarrow$ 3 $\quad \downarrow$ 2

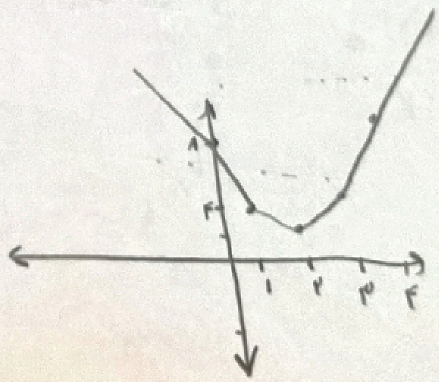
$x=0 \to |0-1|+|0-3|+|0-4|=8$ | $^0_8$

$x=1 \to |1-1|+|1-3|+|2-4|=4$ | $^1_4$

$x=2 \to |2-1|+|2-3|+|4-4|=2$ | $^2_2$

$x=3 \to |3-1|+|3-3|+|6-4|=4$ | $^3_4$

$x=4 \to |4-1|+|4-3|+|8-4|=8$ | $^4_8$



$\boxed{\text{کمترین تعداد}=2}$

شهرزاد شونشی

۵)

$y = |x| - 2|x+1|$

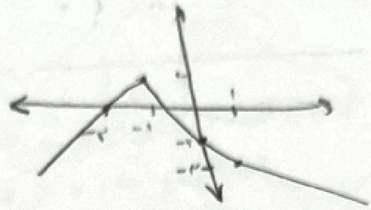
$\underbrace{\quad}_{0} \qquad \underbrace{\quad\quad}_{-1}$

$x=1 \to |1| - 2|2| = -3$

$x=0 \to |0| - 2|0+1| = -2$

$x=-1 \to |-1| - 2|0| = 1$

$x=-2 \to |-2| - 2|-2+1| = 0$



$R_y = (-\infty, 1]$

۶)

$yx + y = x^2 + 5x + m \to x^2 + x(5-y) + m - y$

$(5-y)^2 - 4(m-y) \to 25 + y^2 - 10y - 4m + 4y \Rightarrow y^2 - 6y + 25 - 4m \geq$

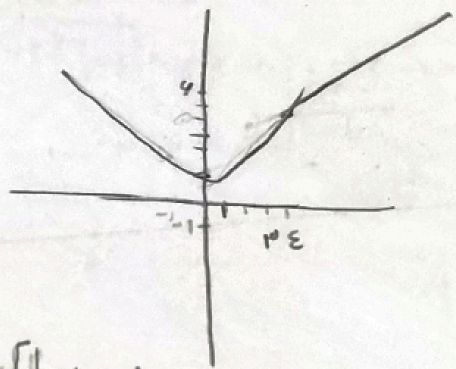
$36 - 4(25 - 4m) < 0 \to 36 - 100 + 16m < 0 \to 16m < 64 \to m < 4 \to m = 1, 2, 3$

۷)

$x \geq 3 \to x + 2$

$x = 3 \to 3 + 2 = 5$

$x = 4 \to 4 + 2 = 6$



$x^2 - 2x + 2 \quad 0 \leq x < 3$

$R_f = [1, +\infty)$

$x = 3 \to 9 - 6 + 2 = 5$

$x = 0 \to 0 - 0 + 2 = 2$

$x < 0 \to |x| + 2$

$x = 0 \to 0 + 2 = 2$

$x = -1 \to |-1| + 2 = 3$

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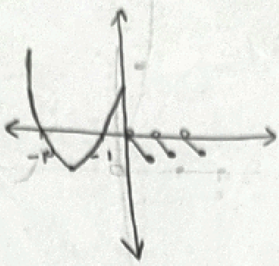
۸)

$$f(x)=\begin{cases} x^2+4x+3 & x\leq 0 \quad (x+1)(x+3) \\ [2x]-2x & x>0 \end{cases}$$



$y = x^2+4x+3 = (x+1)(x+3) \to x=-1, x=-3$

$R_y = [-1, +\infty)$

$0 \geq [2x] - 2x > -1$

-1 .

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۹)

$y = a+1-\sqrt{2x+3}$

$D_y: 2x+3 \geq 0 \to 2x \geq -3 \to x \geq -\frac{3}{2} \quad b=-\frac{3}{2}$

$x=-\frac{3}{2} \to a+1-\sqrt{2\times\frac{-3}{2}+3} = 5 \to a+1=5 \to a=4$

$ab = -\frac{3}{\cancel{2}} \times \overset{2}{\cancel{4}} = -6$

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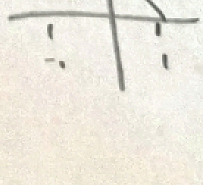
۱۰)

$f(x)+g(x) = 3\sqrt{2+2\sqrt{1-x^2}} \qquad f(x) = 2\sqrt{x+1} + 4\sqrt{1-x}$

$f(x)+g(x) = \left(3\sqrt{2+2\sqrt{1-x^2}}\right)^2 \to 9\left(\sqrt{1-x}+\sqrt{1+x}\right)^2 \to 3\sqrt{1-x}+\sqrt{1+x}$

$g(x) = \sqrt{1+x} - \sqrt{1-x} \qquad \frac{f(x)}{4} - \frac{g(x)}{4} = \sqrt{1-x}$



$R = [0, \sqrt{2}]$