

$$1) f(x) = 2 \sin^2(x + \frac{\pi}{2}) - 1$$

$$\sin^2 \sim \text{شکل } 1 \rightarrow f(1) = 1, 1$$

$$\sin^2 \sim \text{شکل } 0 \rightarrow f(0) = 1, -1 \rightarrow R \subseteq [-1, 1]$$

$$2) g(x) = 2 \cos^2 x$$

$$\cos^2 \sim \text{شکل } 1 \rightarrow g(1) = 2, 1$$

$$\cos^2 \sim \text{شکل } 0 \rightarrow g(-1) = 2, -1 \rightarrow R \subseteq [-1, 2]$$

$$y = \frac{x}{1+x^2} \quad -2 \leq x \leq 2 \quad |x| \leq 2 \quad -1, 2, -2$$

$$-2 \leq x \leq -1 \quad |x| \leq 2 \quad -1, 2, -2$$

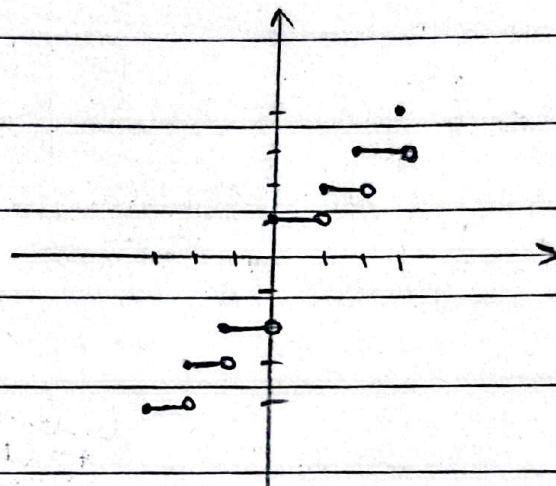
$$-1 \leq x \leq 0 \quad |x| \leq 2 \quad -1, 2, -2$$

$$0 \leq x \leq 1 \quad |x| \leq 2 \quad 1, 0, 1$$

$$1 \leq x \leq 2 \quad |x| \leq 2 \quad 1, 1, 2$$

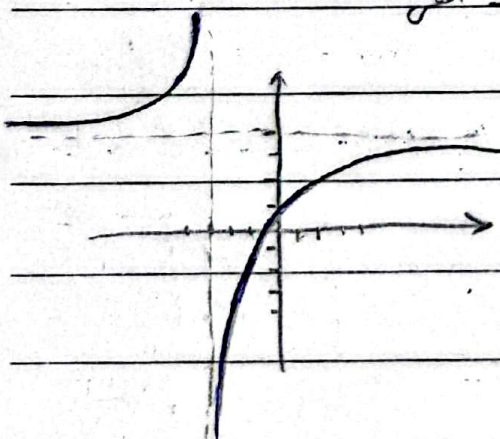
$$2 \leq x \leq 2 \quad |x| \leq 2 \quad 1, 2, 2$$

$$x \geq 2 \quad |x| \leq 2 \quad 1, 2, 2$$



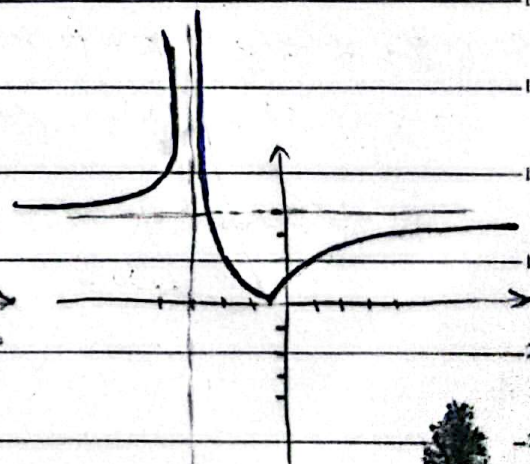
$$y = \frac{x^2+1}{x^2+2} \quad \text{حد افقی: } 1, \text{ حد عمودی: } x=0$$

$$x: \text{جنب افقی}$$



حد افقی: 1

حد عمودی: x=0

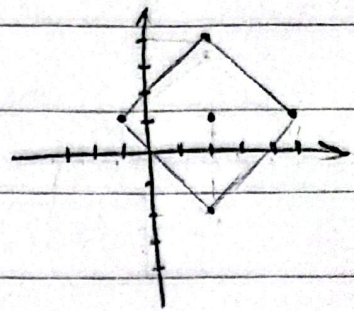


1. $x < 2, y < 1 \rightarrow 2 - x + 1 - y = 3 \rightarrow y = -x$

2. $x < 2, y > 1 \rightarrow 2 - x + y - 1 = 3 \rightarrow y = x + 2$

3. $x > 2, y > 1 \rightarrow x - 2 + y - 1 = 3 \rightarrow y = -x + 6$

4. $x > 2, y < 1 \rightarrow x - 2 + 1 - y = 3 \rightarrow y = x - 4$



6. الف) $P(x) = x + \frac{1}{x} + \sqrt{x + \frac{1}{x}} \rightarrow t + \sqrt{t} = (\sqrt{t} + 1)^2 - 1$

$R = [2\sqrt{2} + 2, +\infty)$

8. $x + \frac{1}{x} \geq 0 \rightarrow x > 0$: $x + \frac{1}{x} \geq 2 \rightarrow (\sqrt{t} + 1)^2 - 1 \geq (\sqrt{t} + 1)^2 - 1 \geq 2\sqrt{2} + 2$

10. ب) $(3 - \sin x)(1 + \sin x) = -\sin^2 x + 2\sin x + 3$ $\xrightarrow{\text{max}} 1 + 2 + 3 = 6$

$\xrightarrow{\text{min}} 1 - 2 + 3 = 2$

$R = [2, 6]$

$\frac{-b}{2a} = \frac{-2}{-2} = 1 \rightarrow -1 + 2 + 3 = 4$

$\frac{10 \times 9}{4} = 22.5$

14. مجموع اقصای برد: $-1/2 \times 1 + 10 = -1/2 \times 9 + 10 = -1/2(1 + -9) + 9 \times 10$

15. $\frac{-90}{3} + 90 = 90 - 30 = 60$

16. $2b + c \geq 0$: $a \leq 0$: b و c برای اعداد حقیقی و $[2, +\infty)$: $a \geq 0$

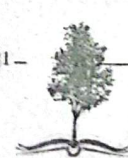
17. $2b + c \leq 1 \rightarrow b \geq 1/2, c \leq 2$ $\rightarrow g(x) = \sqrt{x^2 + 4} \rightarrow \frac{-\Delta}{2a} = 0 \rightarrow \sqrt{4}$

$\rightarrow R = [2, +\infty)$

19. $f(x) = \frac{x(x+2)(x-2)}{x+2} \rightarrow \frac{x(x-2)}{1} \rightarrow \frac{-\Delta}{2a} = -1 = c$

20. $x^2 - 2x + 1 = (x-1)^2$: $(x-1)^2 = 0 \rightarrow x = 1$

21. $a = -2, b = 0$



Senobar

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

$$y = \sqrt{(x+t)^2} \Rightarrow x^2 - 4x^2 + 12x - 1$$

9. تابع معین:

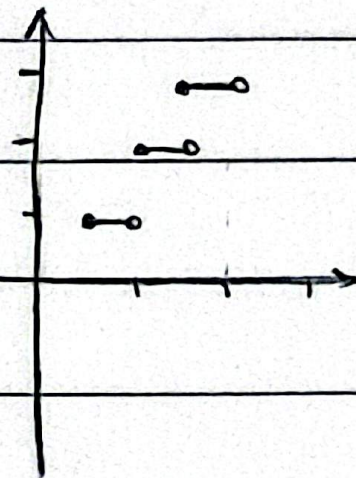
$$t^2 - 1 \rightarrow t^2 - 2 \quad a = -4, b = 12$$

$$y = x^2 \Rightarrow R = [-1, 1]$$

$$\frac{1}{r} < x < 1 \quad [n] = 0 \rightarrow 0 + 1 \leq 1$$

$$1 < x < \frac{2}{r} \quad [n] = 1 \rightarrow 1 + 1 \leq 2$$

$$\frac{2}{r} < x < 2 \quad [n] = 1 \rightarrow 1 + 2 \leq 2$$



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