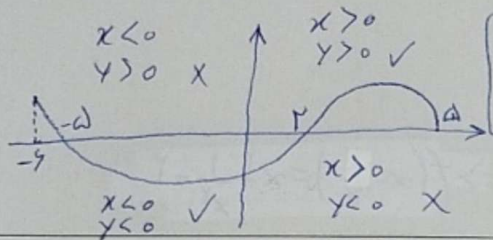


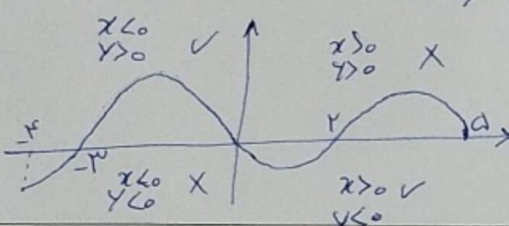
$$y = \sqrt{xf(x)} \rightarrow \sqrt{xf(x)} \geq 0 \Rightarrow xf(x) \geq 0 \begin{cases} x > 0, f(x) \geq 0 \Rightarrow y > 0 \\ x < 0, f(x) \leq 0 \Rightarrow y < 0 \end{cases}$$



$$\Rightarrow D_f = [-a, 0] \cup [0, a]$$

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$$y = \frac{-x}{f(x)} \rightarrow \frac{-x}{f(x)} \geq 0 \begin{cases} x > 0, f(x) \leq 0 \\ x < 0, f(x) \geq 0 \end{cases} \quad f(x) \neq 0$$



$$\Rightarrow D_f = (-a, 0) \cup (0, a)$$

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$$f(x) - 2f(2) = x^2 - 2x + 2 \xrightarrow{x=2} f(2) - 2f(2) = 2^2 - (2 \times 2) + 2 \Rightarrow -f(2) = 4 - 4 + 2 = 2 \Rightarrow f(2) = -2$$

$$f(-2) - 2(-2) = (-2)^2 - (2 \times (-2)) + 2 \Rightarrow f(-2) + 4 = 4 + 4 + 2 \Rightarrow f(-2) = 6$$

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$$f(f(a)) + f(f(1)) = 7 + 2 = 9$$

$$f(x) = \begin{cases} x - \sqrt{x+9} & ; x > 3 \\ 2x + 3 & ; x \leq 3 \end{cases}$$

$$f(a) = a - \sqrt{a+9} = a - \sqrt{9} = a - 3 = 2$$

$$f(2) = 2(2) + 3 = 4 + 3 = 7$$

$$f(1) = 2(1) + 3 = 2 + 3 = 5$$

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$$f(x) = ax^2 - bx + 2$$

$$\xrightarrow{x=1} f(x-1) = a(x^2+1-2x) - b(x-1) + 2 = ax^2 + a - 2xa - bx + b + 2$$

$$f(x-1) - f(x) = 9x + 2 \Rightarrow ax^2 + a - 2xa - bx + b + 2 - ax^2 + bx - 2 = 9x + 2$$

$$\Rightarrow a - 2xa + b = 9x + 2 \rightarrow -2xa = 9x \Rightarrow a = -\frac{9}{2} \rightarrow -\frac{9}{2} + b = 2 \Rightarrow b = \frac{13}{2}$$

$$\Rightarrow a - b = -\frac{9}{2} - \frac{13}{2} = -11$$

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$$f(x) = \frac{x^2 + 2x + 1}{x^2 + 2x + 1} \Rightarrow f(x) = \frac{V - 2\sqrt{3} + 2\sqrt{3} - 1 + 2}{V - 2\sqrt{3} + 2\sqrt{3} - 1 + V} = \frac{V - 1 + 2}{V - 1 + V} = \frac{f}{g} = \frac{2}{3}$$

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

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$$(\sqrt{3}-2)^2 = 3 + 4 - 2\sqrt{3} = 7 - 2\sqrt{3}$$

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

$$\Rightarrow f(-3) = (-3)^2 + 2 = 9 + 2 = 11$$

7

$$a) \frac{f}{g} = \left\{ \left(2, \frac{0}{\sqrt{2}}\right), \left(1, \frac{2}{\sqrt{2}}\right), \left(0, \frac{2}{\sqrt{2}}\right) \right\}$$

$$\sqrt{9-x^2} > 0 \Rightarrow 9-x^2 > 0 \Rightarrow x^2 < 9 \Rightarrow -3 < x < 3$$

$$b) \frac{g}{f} = \left\{ \left(1, \frac{\sqrt{2}}{-2}\right), \left(0, \frac{2}{\sqrt{2}}\right) \right\}$$

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$$f \neq 0 \Rightarrow (x, 0) \notin \frac{f}{g}$$

$$a) 2f(x) = \left\{ (2, 2), (2, 1), (-2, 2), (1, -2) \right\}$$

$$b) f(x) + 1 = \left\{ (2, 3), (2, 2), (-2, 3), (1, -1) \right\}$$

$$c) 3f(x) + 1 = \left\{ (2, 4), (2, 3), (-2, 3), (1, 1) \right\}$$

$$d) f(2x) = \left\{ (1, 1), \left(\frac{2}{3}, 2\right), \left(-\frac{2}{3}, 2\right), \left(\frac{1}{3}, -2\right) \right\}$$

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$$a) f-g = \left\{ (2, 2), (2, 2), (1, 4) \right\}$$

$$b) \frac{2f}{g} = \left\{ (2, 6), (2, 2) \right\}$$

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