

تکلیف شماره 5

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$$y = \sqrt{x f(x)}$$

$x \geq 0$

$$x f(x) \geq 0$$

	-a	0	a	
x	-	0	+	+
f(x)	+	0	-	-
x f(x)	-	0	+	-

$$D_f = [-a, 0] \cup [a, \infty)$$

سوال 1!

$$y = \sqrt{\frac{-x}{f(x)}}$$

$$\frac{-x}{f(x)} \geq 0 \rightarrow \begin{cases} -x \geq 0 \rightarrow x \leq 0 \\ f(x) \geq 0 \end{cases}$$

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

	-a	0	a	
-x	+	+	-	-
f(x)	-	0	+	+
-x/f(x)	-	+	-	-

سوال 2

$$f(x) - 2f(2) = x^2 - 3x + 2$$

$$f(-2) = ?$$

$$x=2 \rightarrow -f(2) = 2 - 4 + 2 \rightarrow f(2) = -2$$

$$x=-2 \rightarrow f(-2) + 4 = \frac{16}{-2} - 6 + 2 \rightarrow f(-2) = 10$$

سوال 3

$$f(x) = \begin{cases} x - \sqrt{x+2} & x \geq 2 \\ x + 2 & x < 2 \end{cases}$$

$$x=2 \rightarrow 2$$

$$x=2 \rightarrow 4$$

$$x=1 \rightarrow 3$$

$$f(f(a)) + f(f(1)) = ?$$

$$a + 1 = 9$$

$$a - b = ? \rightarrow a = 1$$

$$\begin{cases} f(x+1) - f(x) = 4x+5, & f(x) = ax^2 + bx + c \\ f(x) - f(x+1) = 4x+6 \end{cases} \rightarrow f(x+1) - f(x) = 12x+1$$

$$ax^2 + a(x+1) - bx - b + c - ax^2 - bx - b + c = 12x+1$$

$$-2ax + 2b = 12x+1$$

$$-2ax + b = 4x+1 \rightarrow b = 1$$

$$a = -2$$

$$f(x) = \frac{x^2 + 4x + 5}{x^2 + 2x + 1} = \frac{(\sqrt{x+2})^2 + 4\sqrt{x+2} + 5}{(\sqrt{x+2})^2 + 2\sqrt{x+2} + 1} = \frac{\sqrt{x+2} + 1}{1} = \sqrt{x+2} + 1$$

$$f(\sqrt{x+2}) = ?$$

سوال 4

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

$$f(x) = ?$$

$$x - \frac{1}{x} = -2 \rightarrow x^2 - \frac{1}{x} + 2 = 0 \rightarrow x^2 + \frac{1}{x} = 11$$

سوال 5: $f(x)$ تابعی است که عبارت از مجموع کسرها $\frac{1}{x} + \frac{1}{x+1} + \frac{1}{x+2} + \dots$ می باشد.

سوال 9

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

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

$$1-x^2 \geq 0$$

$$x^2 \leq 1$$

$$-1 \leq x \leq 1 \rightarrow x = -1, -\frac{1}{2}, 0, \frac{1}{2}, 1$$

$$g(x) = \left\{ (-1, 0), (-\frac{1}{2}, \frac{\sqrt{3}}{2}), (0, 1), (\frac{1}{2}, \frac{\sqrt{3}}{2}), (1, 0) \right\}$$

$$x=0 \rightarrow \frac{f}{g} = \frac{1}{\frac{1}{\sqrt{2}}} \rightarrow (0, \frac{1}{\sqrt{2}})$$

$$x=1 \rightarrow \frac{f}{g} = \frac{-1}{\frac{1}{\sqrt{2}}} = -\frac{1}{\sqrt{2}} \rightarrow (1, -\frac{1}{\sqrt{2}})$$

$$x=2 \rightarrow \frac{0}{0} = 0 \rightarrow (2, 0)$$

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

$$x=0 \rightarrow \frac{1}{\frac{1}{\sqrt{2}}} \rightarrow (0, \frac{1}{\sqrt{2}})$$

$$x=1 \rightarrow \frac{-1}{-\frac{1}{\sqrt{2}}} = \frac{1}{\sqrt{2}} \rightarrow (1, \frac{1}{\sqrt{2}})$$

$$x=2 \rightarrow \frac{0}{0} \rightarrow \frac{\sqrt{2}}{0}$$

$$f(x) = \left\{ (2, 1), (3, 4), (-5, 2), (1, 2) \right\} \quad \text{سوال 10}$$

$$\text{الف) } 2f(x) = \left\{ (4, 2), (6, 8), (-10, 4), (2, 4) \right\}$$

$$\text{ب) } f(x)+1 = \left\{ (2, 3), (3, 5), (-5, 3), (1, 3) \right\}$$

$$\text{ج) } 3f^2(x)+1 = \left\{ (2, 13), (3, 49), (-5, 13), (1, 13) \right\} \quad \text{د) } f(2x) = \left\{ (4, 1), (6, 4), (-10, 2), (2, 2) \right\}$$

$$g(x) = \left\{ (0, 0), \left(\frac{1}{2}, 1\right), (-1, 4), (-2, -3), \left(\frac{3}{2}, -1\right) \right\} \quad f(x) = \left\{ \left(\frac{1}{2}, 3\right), (0, 2), (0, 4), \left(\frac{1}{2}, 1\right), \left(\frac{1}{2}, 2\right) \right\} \quad \text{سوال 11}$$

$$\text{الف) } f \cdot g = \left\{ (1, 4), (2, 2), (3, 2) \right\}$$

$$\text{ب) } \frac{2f}{g} = \left\{ \left(\frac{1}{2}, 8\right), (1, 4), \left(\frac{3}{2}, 2\right) \right\}$$

$$x=1 \rightarrow \frac{1}{0} \times \quad x=2 \rightarrow 4 \quad x=3 \rightarrow -2$$