آتنیا زرشاه آبادی

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

$y = \sqrt{x^2 f(x+1)}$ $\quad x^2\left(2^{1-x} - 1\right) \geq 0$

$2 - 1 = 0 \rightarrow 2 = 2^1$

$1 - x = 0$

$x = 1$

$Dy = ?$ $\quad$ 0 1 : + | + | − $\quad Dy = [0, 1]$

۲) $f(x) = \sqrt{x + |x+2|}$

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

$x = 2$

$Df_{(-x)} = ?$

$-x - x + 2$	$-x + x - 2$
$-2x + 2$	-2

تعریف نشده

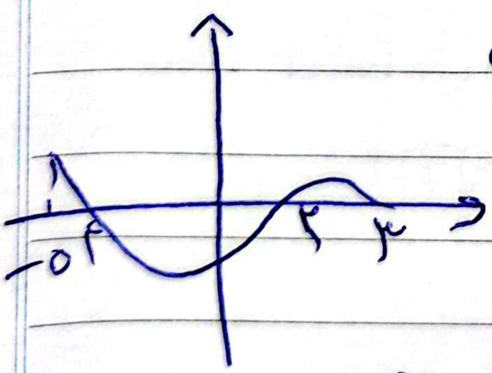
$-2x + 2 \geq 0$

$2(-x+1) \geq 0$

$x = 1$ $\quad$ + 1 − $\quad Df(-\infty, 1]$

۳) $y = \sqrt{\frac{x-1}{f(x)}}$ $\quad x = 1$

$x = -4, 2, 3$



−4 1 2 3 : − | + | − | + | −

$Dy = (-4, 1] \cup (2, 3)$

۴) $D_{y_1} = D_{y_2}$ $\sqrt{-(a+b)}$

$y_1 = \frac{1}{9x^2 - 12x - 3}$ $9x^2 - 4x^2 - x^2 - (4x - 4 + 7)$

$(9x^2 - 4x^2 + 1) - x^2 - (4x - 4)$

$\sqrt{(3x^2 - 1)^2}$ $-(x+2)^2$

$y_2 = \frac{1}{3x^2 + 9x + b}$ $3x^2 - x - 3 = 3x^2 + ax + b$

$a = -1$
$b = -3$

$(3x^2 - 1)^2 - (x+2)^2 + 0$

$\rightarrow 3x^2 - 1 = x + 2 \rightarrow 3x^2 - x - 3 = 0$

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

۵) $f(x) = x^2 + x$ $Dy = ?$

$y = \sqrt{f(x) - f(\frac{x}{2})}$ $y = \sqrt{x^2 + x - \frac{x^2}{4} - \frac{x}{2}}$

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

$y = \sqrt{\frac{1}{2x^2}(x^2 - 4)(x^4 + 14 + 4x^2) + \frac{1}{2}(x^2 - 4}$

$\Rightarrow \sqrt{\frac{1}{2}(x^2 - 4)(\frac{1}{2x^2}(x^4 + 14 + 4x^2) + 1)}$

$Dy = (-2, 0) \cup [2, +\infty)$

-2 0 2

$-1 + 0 - 1 +$

(4

$f(x^3+x) = 2x^2-1$

$x^3+x=2 \rightarrow x=1$

$f(2)+f(10)=?$ $\quad x^3+x=10 \rightarrow x=2$

$f(2) = 2-1=1$

$f(10) = 8-1=7$

$f(2)+f(10)=8$

(7

$f(x) = x^3-6x^2+12x+8-8 \rightarrow (x-2)^3+8$

$g(x) = x^3+9x^2+27x+27-27 \rightarrow (x+3)^3-27$

$\dfrac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)} = ? \qquad \dfrac{(\sqrt[3]{7}-3+3)^3-27}{(\sqrt[3]{2}+2-2)^3+8} = \dfrac{7-27}{2+8} = -2$

(5

$f(x) = \sqrt{\;}\;\dfrac{x+2}{x^2-4x+3}$ $\qquad D_f = R-\{1,3\}$

$(x-1)(x-3) \rightarrow x = 1, 3$

$g(x) = \{(2,1),(1,0),(3,5),(0,4)\}$

$\dfrac{g}{f} = ?$ $\qquad \{(2, \frac{1}{-4}), (0, 6)\}$

(8

$\dfrac{a+b}{c} = ?$

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

$g(x) = \sqrt{x-4\sqrt{x-4}}$ $\qquad g(x) = \sqrt{(\sqrt{x-4}-2)^2} \rightarrow \sqrt{x-4}-2$

$f(x)+g(x) = a+b\sqrt{x+c}$ $\qquad \sqrt{x-4}+2+\sqrt{x-4}-2$

Scbo $= 2\sqrt{x-4}$ $\rightarrow a=0,\ b=2,\ c=-4$

Scanned with CamScanner

10) $f(x) = \{(1,2)(3,-1)(5,2)(-1,4)\}$

$g(x) = \{(-1,5)(2,3)(-1,1)(3,-4)\}$

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

$f(x^2) = \{(2,\pm 2)(-1,\pm\sqrt{3})(2,\pm 1)\}$

$2g^2(x)+1 = ?\{(1,-1)(9,3)(3,1)(\frac{19}{2},2)\}$

$\frac{f}{g} = ?\{(\frac{13}{5},-1)(-1,3)(-4,1)\}$

$\{(1,3)(-4,1)\}$