

$f(x) = \begin{cases} (a+1)(x+2) & ; x \leq 1 \\ 2a+2x & ; x > 1 \end{cases}$	$2f(a) = f(-2) + a \rightarrow 2((a+1)(a+2)) = 2a - 2 + a$ $1(a+1) + 1(a+1) = 2a - 2 \rightarrow 10a = -18 \rightarrow a = \frac{-18}{10} = -1.8$ جواب	1
$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + 2$ $f(2-\sqrt{2}) = \frac{\sqrt{2}-1}{\sqrt{2}} + \frac{1}{\sqrt{2}-1} + 2 = \frac{\sqrt{2}-1}{2} + \frac{\sqrt{2}+1}{2} + 2 = \sqrt{2} + 2$ $f(2+\sqrt{2}) = \frac{\sqrt{2}+1}{\sqrt{2}} + \frac{1}{\sqrt{2}+1} + 2 = \frac{\sqrt{2}+1}{2} + \frac{\sqrt{2}-1}{2} + 2 = \sqrt{2} + 2$	$f(2-\sqrt{2}) + f(2+\sqrt{2}) = 2\sqrt{2} + 4$ جواب	2
$2f(x) - 2f(-x) = 2x^2 - x \rightarrow x^2$ $2f(-x) - 2f(x) = 2x^2 + x \rightarrow x^2$	$4f(x) - 4f(-x) = 4x^2 - 2x$ $4f(-x) - 4f(x) = 4x^2 + 2x$ $-8f(x) = 2x - 4x^2 \rightarrow f(x) = \frac{2}{8}x^2 - \frac{x}{4} = \frac{1}{4}x^2 - \frac{x}{4}$ جواب	3
$(x+2)f(x) - 2xf(x+2) = 2x^2 - mx + 3m-1$ $4f(0) = 14 + 2m + 2m - 1 \rightarrow 4f(0) = 8m + 13$ $4f(0) = 5 \times \frac{1}{4} + 13 \rightarrow f(0) = \frac{53}{4} = \frac{13.25}{1}$ جواب	$2f(0) = 3m - 1$ $4f(0) = 9m - 2$ $8m + 13 = 9m - 2 \rightarrow 4m = 15 \rightarrow m = \frac{15}{4}$	4
$f(x) + f\left(\frac{1}{x}\right) = \frac{2x^2 - 12x + 2}{x}$ $ax + b + \frac{a}{x} + b = \frac{2x^2 - 12x + 2}{x} \rightarrow ax^2 + bx + \frac{a}{x} + b = \frac{2x^2 - 12x + 2}{x}$ $f(-1) = -2 - 4 = -6$ جواب	$f(x) = ax + b \rightarrow f(x) = 2x - 4$ $a = 2, b = -4$	5
$f(x) = (x-1)\sqrt{1-x} \geq 0 \rightarrow 1-x \geq 0 \rightarrow x \leq 1$ $g(x) = 2 - \sqrt{1-x} \geq 0 \rightarrow (1-x) \geq 0 \rightarrow 1-x \geq 0 \rightarrow x \leq 1$ $f(x) = g(x)$ جواب	$D_f = D_g$ از عدد جابجایی کنیم تا به هم برسیم. دو تابع به هم برابرند.	6
$f(x) = x\sqrt{x} \geq 0 \rightarrow x \geq 0$ $g(x) = \sqrt{x^3} \geq 0 \rightarrow x^3 \geq 0 \rightarrow x \geq 0$	$D_f = D_g$ از عدد جابجایی کنیم تا به هم برسیم. دو تابع به هم برابرند.	7
$f(x) = [\sqrt{x}] - [\sqrt{x-1}] \quad x \geq 0 \quad D_f = [0, +\infty)$ $g(x) = \sqrt{x-1} \geq 0 \rightarrow x-1 \geq 0 \rightarrow x \geq 1 \rightarrow D_g = [1, +\infty)$	$D_f = D_g$ از عدد جابجایی کنیم تا به هم برسیم. دو تابع به هم برابرند.	8
الف) $\left(\frac{f+g}{f-g}\right)(1) \rightarrow \frac{2+1}{2-1} = \frac{3}{1} = 3$ جواب ب) $\left(\frac{f+g}{f-g}\right)(2) \rightarrow \frac{3+2}{3-2} = \frac{5}{1} = 5$ جواب ج) $f(0)g(-1) \rightarrow 0 \times 1 = 0$ جواب		9
الف) $g(x) = f(3x-1)$ $3x-1=2 \rightarrow x=1$ و $3x-1=-1 \rightarrow x=0$ و $3x-1=0 \rightarrow x=\frac{1}{3}$ و $3x-1=2 \rightarrow x=1$ و $3x-1=3 \rightarrow x=\frac{4}{3}$ جواب: $\left\{ \left(\frac{1}{3}, 0\right), (1, 1), (2, 2), (3, 3) \right\}$ ب) $h(x) = f(x) \rightarrow x =2 \rightarrow x=2$ و $x =1 \rightarrow x=1$ و $x =0 \rightarrow x=0$ و $x =3 \rightarrow x=3$ و $x =4 \rightarrow x=4$ جواب: $\left\{ (2, 1), (1, 1), (0, 0), (3, 1), (4, 1) \right\}$		10