

$f(x) = \frac{x^2 + 4x + 5}{x^2 + 2x + 1} \quad f(\sqrt{3} - 2)$ $x^2 + 4x + 5 \Rightarrow (\sqrt{3} - 2)^2 = (\sqrt{3})^2 - 2 \times 2 \times \sqrt{3} + 2^2 = 3 - 4\sqrt{3} + 4 = 7 - 4\sqrt{3}$ $(7 - 4\sqrt{3}) + 2(\sqrt{3} - 2) + 5 \Rightarrow -8 + 7 + 5 = 4 \quad \text{مخرج}$ $x^2 + 4x = -8 + 7 = -1$ $-1 + 7 = 6 \quad \text{مخرج}$ $\text{جواب نهایی} = \frac{4}{6} = \frac{2}{3}$	6
$f\left(x - \frac{1}{x}\right) = \frac{x^2 + 1}{x^2} \quad f(-3) = ?$ $\frac{x^2 + 1}{x^2} = x^2 + \frac{1}{x^2} \Rightarrow f\left(x - \frac{1}{x}\right) = x^2 + \frac{1}{x^2}$ $\left(x - \frac{1}{x}\right)^2 = x^2 - 2 \times x \times \frac{1}{x} + \left(\frac{1}{x}\right)^2$ $\Rightarrow \left(x - \frac{1}{x}\right)^2 = x^2 - 2 + \frac{1}{x^2} \Rightarrow x^2 + \frac{1}{x^2} = \left(x - \frac{1}{x}\right)^2 + 2$ $\Rightarrow f\left(x - \frac{1}{x}\right) = \left(x - \frac{1}{x}\right)^2 + 2 \Rightarrow f(-3) = (-3)^2 + 2 \Rightarrow \boxed{f(-3) = 11}$	7
$g(x) = \sqrt{9 - x^2} \quad f(x) = \{(2, 0), (1, -2), (0, 2), (3, 1)\}$ الف) $\frac{f}{g} = \{(0, \frac{2}{3}), (1, \frac{-2}{\sqrt{8}}), (2, \frac{0}{\sqrt{5}})\} \Rightarrow \{(0, \frac{2}{3}), (1, \frac{-2}{\sqrt{8}}), (2, 0)\}$ ب) $\frac{g}{f} = \{(0, \frac{3}{2}), (1, \frac{\sqrt{8}}{-2}), (2, \frac{\sqrt{5}}{0})\} \Rightarrow \{(0, \frac{3}{2}), (1, \frac{\sqrt{8}}{-2})\}$ تعریف شده	8
$f(x) = \{(2, 1), (3, 4), (-5, 2), (1, -2)\}$ الف) $2f(x) = \{(2, 2), (3, 8), (-5, 4), (1, -4)\}$ ب) $f(x) + 1 = \{(2, 2), (3, 5), (-5, 3), (1, -1)\}$ ج) $3f^2(x) + 1 = \{(2, 4), (3, 49), (-5, 13), (1, 13)\}$ د) $f(2x) = \{(1, 1), (1.5, 2), (-2.5, 2), (0.5, -2)\}$	9
$f(x) = \{(2, 3), (5, 2), (6, 4), (3, 1), (5, 2)\} \quad g(x) = \{(1, 0), (2, 1), (4, 4), (-2, -3), (3, -1)\}$ الف) $f - g \Rightarrow \{(1, 4), (2, 2), (3, 2)\}$ ب) $\frac{2f}{g} \Rightarrow \{(1, \frac{2}{0}), (2, 2), (3, -2)\} \Rightarrow \{(2, -2), (3, -2)\}$ تعریف نشده $\Rightarrow 2f = \{(2, 4), (5, 4), (1, 8), (3, 2), (5, 4)\}$	10