

$xf(x) \geq 0$ $f(x) > 0 \rightarrow [-9, -\omega) \cup (2, \omega]$ $f(x) < 0 \rightarrow (-\omega, 2)$ $f(x) \leq 0 \Rightarrow [-\omega, 0]$ $x < 0 \Rightarrow [-\omega, 0]$ $f(x) \geq 0 \Rightarrow [2, \omega]$ $x > 0 \Rightarrow [2, \omega]$	$D_f = [-\omega, 0] \cup [2, \omega]$	۱
$\frac{-x}{f(x)} \geq 0$ $f(x) \neq 0$ $(-4, -3) \cap (2, \omega) \cap \dots$ $(-3, 0) \checkmark$ $(0, 2) \checkmark$ $D_f = (-3, 0) \cup (0, 2)$ $x = 0$ عدد صحیح	$f(x) = x^2 - 3x + 4$ $f(x) + 4 = x^2 - 3x + 8$ $f(x) = x^2 - 3x$	۲
$f(x) - 2f(2) = 4 - 9 + 4$ $-f(x) = 2$ $f(x) = -2$ $f(-2) = (-2)^2 - 2(-2) = 10$	$f(x) - 2f(2) = x^2 - 3x + 4$ $f(x) + 4 = x^2 - 3x + 8$ $f(x) = x^2 - 3x$	۳
$f(1) = 2(1) + 3 = 5$ $f(\omega) = \omega - \sqrt{\omega + 4} = \omega - 3 = 2$ $f(f(1)) + f(\omega) = 9 + 2 = 11$ $f(2)$	$1 \leq 3$ $\omega > 3$ $f(\omega) = \omega - \sqrt{\omega + 4} = 2$ $f(1) = 2(1) + 3 = 5$ $f(f(\omega)) + f(f(1)) = f(2) + f(5)$ $f(2) = 2(2) + 3 = 7$	۴
$f(x-1) = a(x-1)^2 - b(x-1) + 2$ $= a(x^2 + 1 - 2x) - b(x-1) + 2 = (ax^2 + a - 2ax - bx + b + 2) - (ax^2 - bx + 2)$ $= a - 2x + b$ $-2ax + a + b = -4x + 2$ $-2a = -4$ $a = 2$	$v + 2 = 9$ $a + b = 2$ $b = \omega$ $a - b = -2 - \omega = -1$	۵

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

$$\frac{f(1) + \omega}{1} = V$$

$$f(-1) = (-1)^2 - 3(-1) + 1 = \omega$$

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

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

⊙ ✓

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$$f(x) = 3(x) + 1 = 13 \quad x \gg 1$$

$$f(-2) = (-2)^2 = 4 \quad -2 < 1$$

$$f(2) = 3(2) + 1 = V \quad 2 \gg 1$$

$$\frac{3(13) - f(2)}{V} = \frac{31}{V}$$

⊙ ✓

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$$f(f(x)) = f(1) = 9 \quad f(x) = 1$$

$$f(f(3)) = f(2) = 9 \quad f(3) = 2$$

$$f(1) = 9$$

$$\frac{9-9}{9-2} = 0$$

⊙ ✓

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

$$x + y = \sqrt{2}$$

$$f(\sqrt{2}) = \frac{-1+9}{-1+\omega} = \frac{8}{\omega} = 2$$

$$(x+y)^2 = 2$$

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

$$f(2) = \frac{(2)^2 + f(2) + 9}{(2)^2 + f(2) + \omega} = \frac{11}{14}$$

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

⊙ ✓

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

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

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

⊙ ✓

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