

$y = \sqrt{x f(x)}$
 $\begin{cases} x f(x) \gg 0 \rightarrow x \gg 0 \\ D_{f(x)} = [-4, 5] \end{cases}$
 $[0, +\infty) \cap [-4, 5] \rightarrow D_{x f(x)} = [0, 5] \cup [2, 5]$

$x f(x) \gg 0 \rightarrow x \gg 0 \quad f(x) \gg 0 \quad [2, 5]$
 $\hookrightarrow x \leq 0 \quad f(x) \leq 0 \quad [0, 5]$

۵، ۷، ۵

$y = \sqrt{\frac{-x}{f(x)}}$ $x = -3, x = 0, x = 2, x = 5$ (ریشه‌ها)

-3	0	2	5
-	+	+	-

$\frac{-x}{f(x)} \gg 0$

$D_f = (-3, 0) \cup (0, 2) \rightarrow \{-2, -1, 1\}$

۲

$f(x) - 2f(2) = x^2 - 3x + 4 \xrightarrow{x=2} f(2) - 2f(2) = 4 - 4 + 4 \rightarrow$
 $-f(2) = 4 \rightarrow f(2) = -4 \rightarrow f(x) + 4 = x^2 - 3x + 4 \rightarrow f(x) = x^2 - 3x$
 $f(-2) = 4 + 4 = 8$

۳

$f(x) = \begin{cases} x - \sqrt{x+4} & ; x > 3 \\ 2x + 3 & ; x \leq 3 \end{cases}$

$f(5) = 5 - \sqrt{5+4} = 5 - \sqrt{9} = 5 - 3 = 2 \rightarrow f(f(5)) = f(2) = 4 + 3 = 7$
 $f(1) = 2 + 3 = 5 \rightarrow f(f(1)) = f(5) = 5 - \sqrt{5+4} = 5 - \sqrt{9} = 5 - 3 = 2$
 $f(f(5)) + f(f(1)) = 7 + 2 = 9$

۴

$f(x) = ax^2 - bx + 2 \rightarrow f(x-1) = a(x-1)^2 - b(x-1) + 2 = ax^2 + a - 2ax - bx + b + 2$
 $f(x-1) - f(x) = 4x + 2 \rightarrow ax^2 + a - 2ax - bx + b - ax^2 + bx - 2 = 4x + 2 \rightarrow$
 $a + b - 2ax = 4x + 2$

$\begin{cases} -2ax = 4x \rightarrow a = -2 \\ a + b = 2 \xrightarrow{a=-2} b - 2 = 2 \rightarrow b = 4 \end{cases}$

۵

$a - b = -2 - 4 = -6$

$f(x) = \frac{x^v + fx + \Delta}{x^v + fx + v}$ $f(\sqrt{w} - v) = \frac{(\sqrt{w} - v)^v + f(\sqrt{w} - v) + \Delta}{(\sqrt{w} - v)^v + f(\sqrt{w} - v) + v} = \frac{w + f - f\sqrt{w} + f\sqrt{w} - \Delta + \Delta}{w + f - f\sqrt{w} + f\sqrt{w} - \Delta + v} = \frac{f}{v} = \frac{v}{w}$	<p>6</p> <p style="text-align: right;">(2)</p>
$f(x - \frac{1}{x}) = \frac{x^v + 1}{x^v} = \underbrace{x^v + \frac{1}{x^v}}_{-v + v} = (x - \frac{1}{x})^v + v \rightarrow f(x) = x^v + v$ $f(-w) = (-w)^v + v = 9 + v = 11$	<p>7</p> <p style="text-align: right;">(2)</p>
<p>الف $9 - x^v > 0 \rightarrow x^v < 9 \rightarrow -w < x < w \rightarrow D_g = [-w, w]$</p> <p>$D_f = \{v, 1, 0, v\}$</p> <p>$D_g \cap D_f = \{v, 1, 0\} \rightarrow \frac{f}{g} =$</p> <p>$\{(v, \frac{0}{\Delta}), (1, \frac{-f}{\sqrt{\Delta}}), (0, \frac{v}{w})\} \rightarrow \frac{f}{g} =$</p> <p>$\{(v, 0), (1, -\sqrt{v}), (0, \frac{v}{w})\}$</p>	<p>ب $9 - x^v > 0 \rightarrow x^v < 9 \rightarrow -w < x < w \rightarrow D_g = [-w, w]$</p> <p>$D_f = \{v, 1, 0, v\}$</p> <p>$D_g \cap D_f = \{v, 1, 0\} \rightarrow \frac{g}{f} =$</p> <p>$\{(v, \frac{\Delta}{0}), (1, \frac{\sqrt{\Delta}}{-f}), (0, \frac{w}{v})\} \rightarrow \frac{g}{f} =$</p> <p>$\{(1, \frac{\sqrt{\Delta}}{-f}), (0, \frac{w}{v})\}$</p> <p style="text-align: right;">(2)</p>
<p>الف $vf(x)$</p> <p>ب $f(x) + 1$</p> <p>ج $wf^v(x) + 1$</p> <p>د $f(vx)$</p>	<p>9</p> <p style="text-align: right;">(2)</p>
<p>الف $f - g$</p> <p>$D_f \cap D_g = \{v, w, 1\} \rightarrow f - g =$</p> <p>$\{(v, v), (w, v), (1, f)\}$</p>	<p>ب $\frac{vf}{g}$</p> <p>$D_f \cap D_g = \{v, w, 1\} \rightarrow \frac{vf}{g} =$</p> <p>$\{(v, \frac{v}{1}), (w, \frac{v}{-1}), (1, \frac{\Delta}{0})\}$</p> <p>$\{(v, v), (w, -v)\}$</p> <p style="text-align: right;">(2)</p> <p>10.</p>