

۲. مرتب

$y = \sqrt{x f(x)} \Rightarrow x f(x) \geq 0$ تعیین علامت

از نمودار نقاط $x=0$ و $x=5$ و $x=2$ و $x=-5$ استفاده می‌کنیم.

است و منفی

$\mathcal{D}_f = [-5, 0] \cup [2, 5]$

۲ ✓

$y = \sqrt{\frac{-x}{f(x)}} \Rightarrow \frac{-x}{f(x)} \geq 0$ تعیین علامت

نقاط $x=0$ و $x=2$ و $x=-3$ و $x=5$ را در نظر می‌گیریم.

عدد را با ایندکس یک‌نیم و جواب مثبت و منفی

$\mathcal{D}_f = (-3, 0) \cup (0, 2)$ ۲ ✓

عدد صحیح $\Rightarrow -2, -1, 1, 2$

$f(x) - 2f(2) = x^2 - 3x + 4 \Rightarrow f(x) = x^2 - 3x + 4 + 2f(2)$

$\Rightarrow x=2 \Rightarrow f(2) = 4 - 6 + 4 + 2f(2) \Rightarrow f(2) = -2$

$f(-2) = ? \quad f(x) - 2f(2) = x^2 - 3x + 4 \Rightarrow$

$f(-2) = 4 + 6 + 4 - 4 = 10$ ۲ ✓

$f(f(5)) + f(f(1)) = ? \Rightarrow f(5) \Rightarrow 5 > 3 \Rightarrow x - \sqrt{x+4} = 5 - 3 = 2$

$f(f(5)) = f(2) = ? \Rightarrow 2 \leq 3 \Rightarrow 2n+3 = 7 \Rightarrow n=2 \Rightarrow f(2) = -2$

$f(1) \Rightarrow 1 \leq 3 \Rightarrow 2n+3 = 5 \Rightarrow n=1 \Rightarrow f(1) = 1$

$f(f(5)) = 2$ و $f(f(1)) = -2 \Rightarrow 2 + (-2) = 0$ ۲ ✓

$f(n-1) - f(n) = 6n+2$ و $f(n) = an^2 - bn + 2$

$\stackrel{n-1}{\Rightarrow} f(n-1) = a(n-1)^2 - b(n-1) + 2 = an^2 - 2an + a - bn + b + 2$

$\stackrel{n}{\Rightarrow} f(n) = an^2 - bn + 2$

$-2a = 6 \Rightarrow a = -3$ و $a + b = 2 \Rightarrow -3 + b = 2 \Rightarrow b = 5$

$a - b = -3 - 5 = -8$

$f(n) = n^2 - 3n + 1$ $f(3) = 9 - 9 + 1 = 1 \Rightarrow 2f(3) = 2$ $\frac{2f(3) + f(-1)}{f^2(2)} = \frac{2 + 4}{1} = \frac{6}{1} = 6$ $f(2) = 4 - 6 + 1 = -1 \Rightarrow f^2(2) = 1$	$f(-1) = 1 + 3 + 1 = 4$ $\frac{2}{1} = 2$ جواب
$f(n) = \begin{cases} 3n+1 & n \geq 2 \\ n^2 & n < 2 \end{cases}$ $f(2) = 3(2) + 1 = 7 \Rightarrow 3f(2) = 21$ $f(-2) = (-2)^2 = 4 \Rightarrow -2(f(-2)) = -8$ $f(2) = 7 \Rightarrow 3(2) + 1 = 7$	$\frac{3f(2) - 2f(-2)}{f(2)} = \frac{21 - 8}{7} = \frac{13}{7}$ جواب
$f = \{(0, 4), (3, 2), (5, 1), (6, 4)\}$ $\frac{f(f(5)) - f(f(3))}{f(1) - 2} = \frac{4 - 2}{1 - 2} = \frac{2}{-1} = -2$ $f(5) = 1 \Rightarrow f(1) = 4, f(3) = 2 \Rightarrow f(2) = 4$ $f(1) = 4 \Rightarrow f(1) - 2 = 2$	جواب
$f(n) = \frac{n^2 + 8n + 9}{n^2 + 8n + 4}$ $f(\sqrt{3} - 2) = \frac{(\sqrt{3} - 2)^2 + 8(\sqrt{3} - 2) + 9}{(\sqrt{3} - 2)^2 + 8(\sqrt{3} - 2) + 4} = \frac{3 - 4\sqrt{3} + 4 + 8\sqrt{3} - 16 + 9}{3 - 4\sqrt{3} + 4 + 8\sqrt{3} - 16 + 4} = \frac{10 + 4\sqrt{3} - 9}{10 + 4\sqrt{3} - 9} = 1$ $\frac{1}{2} = 2 \Rightarrow f(2) = \frac{2^2 + 8(2) + 9}{2^2 + 8(2) + 4} = \frac{4 + 16 + 9}{4 + 16 + 4} = \frac{29}{24}$	جواب
$f(n) = n^2 + \frac{1}{n^2}$ $f(\sqrt{n}) = (\sqrt{n})^2 + \frac{1}{(\sqrt{n})^2} = n + \frac{1}{n}$ $f(n) = n^2 + \frac{1}{n^2} \Rightarrow n^2 + 2 + \frac{1}{n^2} - n^2 - \frac{1}{n^2} = 2$	جواب