

نام و نام خانوادگی: کلاس: پاسخنامه تشریحی تکلیف شماره: (در زیر خط بنویسید)

پایان آزمون: تلفات شما 6 ملا حساب (این شش سری بعد از هفته آینده صورتی میگیرد)

$y = f(x)$
 $y = \sqrt{x+2}$
 $f(x) = 0 \Rightarrow x = -2, x = -5$
 $f(x) > 0$ (در بازه $[-2, 5]$)
 $f(x) < 0$ (در بازه $[-5, -2]$)
 $D = [-5, 0] \cup [2, 5]$ (✓)

x	$f(x)$	x	$f(x)$
-	+	-	$[-5, -2]$
+	-	-	$[2, 5]$
-	-	+	$(0, 2)$
+	+	+	$[2, 5]$

$y = \sqrt{\frac{-x}{f(x)}}$
 $\frac{-x}{f(x)} \geq 0$
 $f(x) \neq 0$
 $x = -3, x = 0, x = 2$
 $f(-3) = 0, f(0) = 0, f(2) = 0$
 $f(x) < 0 \Rightarrow x \in (-3, -1) \cup (0, 2)$
 $f(x) > 0 \Rightarrow x \in (-1, 0) \cup (2, 3)$
 $D = (-3, 0) \cup (0, 2)$ (✓)

$f(-2) - 2f(2) = 4 + 4 + 4 = 12 \rightarrow f(-2) = 1$

$f(2) - 2f(2) = 4 - 4 + 2$

$-f(2) = 2 \Rightarrow f(2) = -2$ (✓)

$f(x) = \sqrt{x+3}$
 $x > 3 \Rightarrow f(x) = 0 - \sqrt{5+3} = 0 \Rightarrow f(5) = f(3)$
 $x < 3 \Rightarrow f(x) = \sqrt{3+3} = \sqrt{6} \Rightarrow f(f(3)) = \sqrt{6}$

$f(1) - f(1) + 3 = 0 \Rightarrow f(f(1)) = f(0)$
 $f(0) = \sqrt{0+3} = \sqrt{3}$
 $f(f(0)) = f(\sqrt{3}) = \sqrt{\sqrt{3}+3}$
 $U + 2 = 9$ (✓)

$f(x) = ax^2 + bx + c$
 $f(x-1) - f(x) = 4x + 4$
 $a - b = ? \rightarrow -3 - 0 = -1$
 $-4a = 4 \rightarrow a = -1$
 $-3 + b = 2 \rightarrow b = 5$
 $f(x-1) = a(x-1)^2 + b(x-1) + c$
 $f(x-1) - f(x) = (a(x-1)^2 + b(x-1) + c) - (ax^2 + bx + c)$
 $= a(x^2 - 2x + 1) + b(x-1) + c - ax^2 - bx - c$
 $= ax^2 - 2ax + a + bx - b + c - ax^2 - bx - c$
 $= -2ax + a - b$
 $-2ax + a - b = 4x + 4$
 $-2a = 4 \rightarrow a = -2$
 $a - b = -1 \rightarrow -2 - b = -1 \rightarrow b = -1$
 $f(x-1) - f(x) = -2a(x-1) + b = 4x + 4$

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

$$f(-1) = (-1)^2 - 3(-1) + 1 \rightarrow 5$$

$$\frac{f(1) + f(-1)}{f(1)} = ?$$

$$\Rightarrow \frac{5}{1} = 5$$

$$\rightarrow f(1) - f(-1) = 1 + 4 = 5$$

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

(5) ✓

$$\rightarrow f(1) [f(-1)]^2 = f(1) - (-1)^2 = -2$$

$$f(2) = \int_{n^2}^{n^2+1} \frac{1}{n^2} \cdot n^2 \cdot n^2$$

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

$$\frac{f(1) - f(-1)}{f(1)} = \frac{1^2 - (-1)^2}{1} = \frac{0}{1} = 0$$

$$f(-1) = 1$$

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

(0) ✓

$$f\{(1,2), (2,2), (3,2), (4,2)\}$$

$$\frac{f(f(1)) - f(f(2))}{f(1) - 2} = \frac{0}{-1} = 0$$

(0) ✓

$$f(n) = \frac{n^2 + 5n + 9}{n^2 + 5n + 0}$$

$$(3) = n^2 + 5n + 0$$

$$= (n^2 - 1)^2 + 5(n^2 - 1) + 0 =$$

$$f\left(\frac{1}{\sqrt{2}}\right) = ?$$

$$\rightarrow (1 - \frac{1}{\sqrt{2}}) + (1 - \frac{1}{\sqrt{2}}) + 0 = 2 - \frac{2}{\sqrt{2}} = 2 - \sqrt{2}$$

$$(1) \frac{n^2 + 5n + 9}{n^2 + 5n + 0} = \frac{1}{2} \left(\frac{n^2 + 5n + 0}{n^2 + 5n + 0} \right) + \frac{9}{2}$$

(2) ✓

$$f\left(\frac{1}{\sqrt{2}}\right) = \frac{1 + 5 + 9}{2} = \frac{15}{2}$$

$$(2) f(n) = 1 + \frac{5}{n^2 + 5n + 0}$$

$$f(1) = \frac{1^2 + 5(1) + 9}{1^2 + 5(1) + 0} = \frac{15}{6} = \frac{5}{2}$$

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

$$\left(f\left(\frac{1}{\sqrt{2}}\right)\right)^2 \cdot \frac{1}{n} \rightarrow \frac{1}{2} + \frac{1}{2} + 1 - \frac{1}{2} - \frac{1}{2} = 1$$

$$\left(n + \frac{1}{n}\right)^2 = n^2 + \frac{1}{n^2} + 2$$

(1) ✓