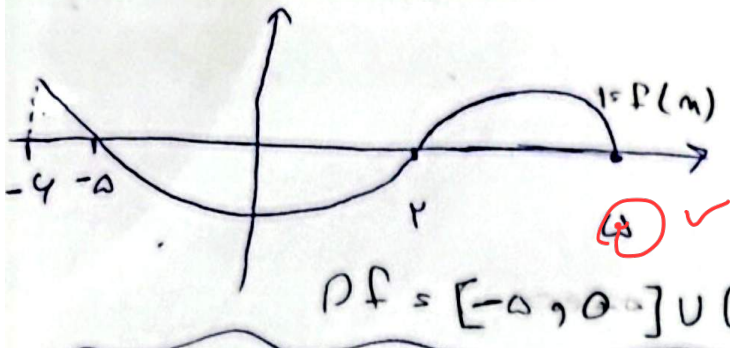
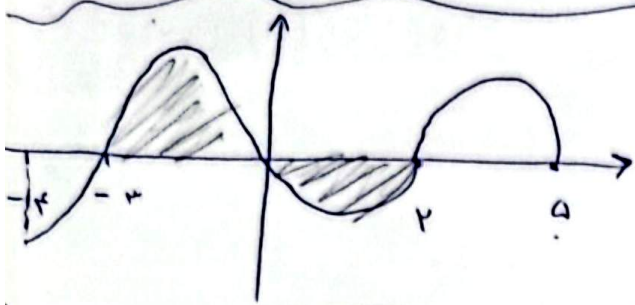
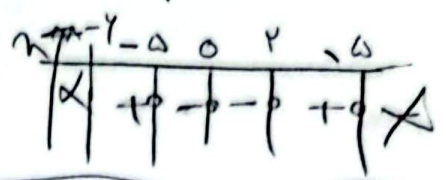


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$\lim_{n \rightarrow \infty} \frac{f(n)}{n} = 0$
 $\downarrow$
 $n \approx 0, 2, -0, 1$

$y = \sqrt{nf(n)}$ (1)



$f(n) + \dots$
 $4n \dots f(n)$
 (2)

$\sqrt{\frac{-n}{f(n)}} \gg 0$
 $0, 2, 0, -2, -4$

$Pf \in (-2, 0) \cup (0, 2)$

$f(n) - 2f(2) = n^2 - 2n + 2 \rightarrow f(n) - 2f(2) = 2 - 4 + 2$ (3)

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

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

$f(f(2)) + f(f(1)) = \dots$
 $f(2) = -2$
 $f(1) = 1$
 $f(-2) = 1$
 $f(1) = 1$
 $1 + 1 = 2$

$f(n-1) - f(n) = 4n + 2 \rightarrow \dots$ (5)

$a(n-1)^2 - b(n-1) + 2 = a(n^2 + 1 - 2n) - bn + b + 2 = 4n + 2$
 $\rightarrow -2an + a + b = 4n + 2 \rightarrow a - b = -2 - 2 = -4$
 $-2a = 4 \rightarrow a = -2$

$2f(2) + f(-1) = \dots$
 $\frac{2+0}{1} = 2$ (6)

$f(n) = n^2 - 2n + 1$ (7)
 $f(2) = 9 - 4 + 1 = 6$
 $f(-1) = 1 + 2 + 1 = 4$
 $f(2) = 2 - 4 + 1 = -1$

(6) ✓

$$\frac{\cancel{19} f(\cancel{1}) - \cancel{1} f(\cancel{-1})}{\cancel{f(1)}} = \frac{\cancel{19} - \cancel{1}}{\cancel{1}} = \left(\frac{\cancel{19}}{\cancel{1}} \right)$$

$$f(n) = \begin{cases} n^{n+1} & n \geq 1 \\ n^n & n < 1 \end{cases} \quad (V) \quad \star$$

$$f(1) = 1^{1+1}$$

$$f(-1) = (-1)^{-1}$$

$$\frac{19}{19}$$

$$\frac{\cancel{f(1)} - \cancel{f(1)}}{\cancel{f(1)}} = \frac{\cancel{4} - \cancel{4}}{\cancel{4} - \cancel{4}} = 0$$

$$f = \{(1, 4), (4, 1), (1, 1), (1, 1)\} \quad (A)$$

$$f(f(\sqrt{x} - 1)) = ?$$

$$f(n) = \frac{n^2 + n + 9}{n^2 + n + 4} \quad (9)$$

$$f(\sqrt{x} - 1) = \frac{(\sqrt{x} - 1)^2 + (\sqrt{x} - 1) + 9}{(\sqrt{x} - 1)^2 + (\sqrt{x} - 1) + 4} = \frac{\cancel{1} + \cancel{1} - \cancel{1}\sqrt{x} + \cancel{1}\sqrt{x} - \cancel{1} + 9}{\cancel{1} + \cancel{1} - \cancel{1}\sqrt{x} + \cancel{1}\sqrt{x} - \cancel{1} + 4} = \frac{1}{1} = 1$$

$$\underbrace{(f(\sqrt{n}))^2}_{\left(n + \frac{1}{n}\right)^2} - \underbrace{f(n)}_{n^2 + \frac{1}{n^2}} = n^2 + \frac{1}{n^2} + 2 - n^2 - \frac{1}{n^2} = 2 \quad (2) \quad f(n) = n^2 + \frac{1}{n^2} \quad (11)$$

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

$$f(\sqrt{x} - 1) = f(1) = \frac{(1 + 1)^2 + 2}{(1 + 1)^2 + 1} = \frac{5}{5} = 1$$