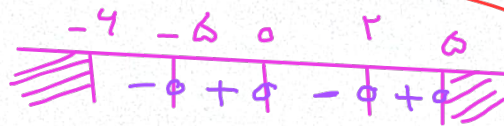
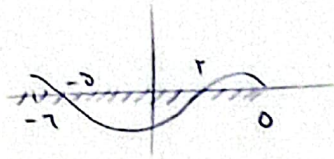


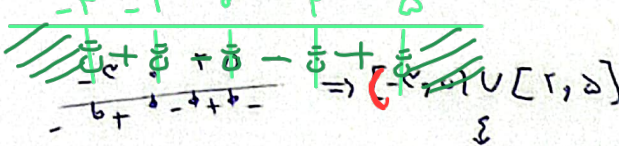
$$y = \sqrt{nf(n)} \Rightarrow nf(n) \geq 0$$

$$D_f = [-5, 0] \cup [2, 5]$$



$$\frac{-n}{f(n)} \geq 0 \rightarrow \frac{n}{f(n)} \leq 0$$

$$y = \sqrt{\frac{-n}{f(n)}} \Rightarrow \frac{-n}{f(n)} \geq 0 \Rightarrow f(n) \neq 0$$



$$D_g = (-3, 2) - \{0\} = (-3, -2) \cup (-2, 0) \cup (0, 2)$$

حالت اول: $f(n) < 0, n > 0$

حالت دوم: $f(n) > 0, n < 0$

$$f(n) - 2f(1) = n^2 - 5n + 4$$

$$f(1) = f(1) - 2f(1) = 4 - 2 + 4 \Rightarrow f(1) = -1$$

$$f(-1) = f(-1) - 2f(-1) = 4 + 2 + 4 \Rightarrow f(-1) = 1$$

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

$$f(1) = 5 \quad f(5) = 5 - 3 = 2$$

$$f(5) = 2 \quad f(2) = 4 + 3 = 7$$

$$f(f(5)) + f(f(1)) = ?$$

$$2 + 7 = 9$$

$$f(n) = an^2 - bn + 1 \quad f(n-1) - f(n) = 7n + 1$$

$$\Rightarrow n=1 \Rightarrow a(n-1)^2 - b(n-1) - an^2 + bn = 7n + 1$$

$$-a + b = 1 \Rightarrow a - b = -1$$

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

$$\frac{r f(2) + f(-1)}{f'(2)} = \frac{r(4 - 4 + 1) + 1 + 2 + 1}{(2 - 2 + 1)^2} = \frac{r + 4}{1} = r$$

(r) ✓

6

$$f(n) = \begin{cases} 2n+1 & n \geq 2 \\ n^2 & n < 2 \end{cases}$$

$$\frac{r f(2) - r f(1-r)}{f'(2)} = \frac{r(4) - r(2)}{2} = \frac{r}{2}$$

(r/2) ✓

7

$$f = \{(2, 2), (2, 2), (2, 1), (1, 2)\}$$

$$\frac{\cancel{f(2)} - \cancel{f(2)}}{\cancel{f(1-2)}} = \frac{4-4}{2} = 0$$

(0) ✓

8

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

$$f(\sqrt{2}-1) = \frac{(\sqrt{2}-1)^2 + 2(\sqrt{2}-1) + 9}{(\sqrt{2}-1)^2 + 2(\sqrt{2}-1) + 2} = \frac{2+2-2\sqrt{2}+2\sqrt{2}-2+9}{2+2-2\sqrt{2}+2\sqrt{2}-2+2} = \frac{9}{2} = 4.5$$

$$f'(2) = \frac{2+2+9}{2+2+2} = \frac{13}{4}$$

(13/4) ✓

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

(n^2 + 1/n^2) ✓

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

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

$$n^2 + \frac{1}{n^2} + 2$$

10