

۱. $f(n)$ طاق غردار روی بازه‌های مختلف کلمات مثبت/منفی دارد.
 $n f(n) \geq 0$
 دامنهٔ f بازه زیر است: $[-4, -2] \cup \{0\} \cup [2, 4]$

۲. $y = \sqrt{\frac{-n}{f(n)}} \rightarrow f(n) \neq 0$ و $\frac{-n}{f(n)} \geq 0 \Rightarrow$
 جواب‌های: $\{2, 0, -2, -4\}$

۳. $n \geq 2 \rightarrow f(2) - 2f(2) = 2^2 - 2 + \varepsilon \rightarrow f(2) = -2$
 $f(n) - 2f(2) = n^2 - 2n + \varepsilon \rightarrow f(n) - 2(-2) = n^2 - 2n + \varepsilon \rightarrow$
 $f(n) = n^2 - 2n \rightarrow f(-2) = (-2)^2 - 2(-2) = 10$

۴. $f(0) = 0 - \sqrt{0+1} = -1 \rightarrow f(2) = 1$
 $f(1) \xrightarrow{1 \leq 2} f(1) = 2 \rightarrow f(f(1)) = 1 \rightarrow f(f(0)) + f(f(1)) = 1 + 1 = 2$
 $(1+1=2)$

$f(n-1) = a(n^2 - 2n + 1) - b(n-1) + c = an^2 - 2an + a - bn + b + c \Rightarrow$
 $f(n-1) - f(n) = (an^2 - 2an + a - bn + b + c) - (an^2 - bn + c) = -2an + a + b$
 $-2an + (a+b) = 6n + 7 \xrightarrow{\text{مقایسه}} \begin{cases} a = -3 \\ b = 5 \end{cases} \rightarrow a-b = -3-5 = -8$

$$f(n) = \frac{n^r + \epsilon n + 1}{n^r + \epsilon n + 1} \rightarrow f(\sqrt{n} - 1) = ?$$

$$f(n) = \frac{(n+r)^r + 1}{(n+r)^r} = 1 + \frac{1}{(n+r)^r} \rightarrow n = \sqrt{n} - 1 \rightarrow (\sqrt{n} - 1 + 1)^r = n^r$$

$$f(\sqrt{n} - 1) = 1 + \frac{1}{n^r} = \frac{\epsilon}{n^r}$$

$$f\left(n - \frac{1}{n}\right) = \frac{n^r + 1}{n^r} \rightarrow f(-r) = ? \Rightarrow \frac{n^r + 1}{n^r} = n^r + \frac{1}{n^r}$$

$$\left(n - \frac{1}{n}\right)^r = n^r + \frac{1}{n^r} - r \Rightarrow n^r + \frac{1}{n^r} = \left(n - \frac{1}{n}\right)^r + r \Rightarrow$$

$$f(y) = y^r + r \rightarrow f(-r) = (-r)^r + r \rightarrow f(-r) = 11$$

برای $n \geq 1$ و $n \geq 2$ اعداد صحیح

$$n=0 \rightarrow \left. \begin{matrix} f(0) = 2 \\ g(0) = 3 \end{matrix} \right\} \rightarrow \left. \begin{matrix} \frac{f}{g}(0) = \frac{2}{3} \\ \frac{g}{f}(0) = \frac{3}{2} \end{matrix} \right\}$$

$$\frac{f}{g} = \left\{ \frac{2}{3}, 9 - \sqrt{2} \right\}$$

$$\frac{g}{f} = \left\{ \frac{3}{2}, 9 - \frac{\sqrt{2}}{2} \right\}$$

$$n=1 \rightarrow \left. \begin{matrix} f(1) = 2 \\ g(1) = 2\sqrt{2} \end{matrix} \right\} \rightarrow \left. \begin{matrix} \frac{f}{g} = -\frac{\sqrt{2}}{2} \\ \frac{g}{f} = \frac{\sqrt{2}}{2} \end{matrix} \right\}$$

$(n \geq 2) \rightarrow 2$ $(n \geq 3) \rightarrow 1$ $(n \geq 4) \rightarrow 2$ $(n \geq 5) \rightarrow -2$ $\{(2,2)(3,1)(-4,2)(1,2)\}$	$(n \geq 2) \rightarrow 2$ $(n \geq 3) \rightarrow 0$ $(n \geq 4) \rightarrow 2$ $(n \geq 5) \rightarrow -1$ $\{(2,2)(3,0)(-4,2)(1,-1)\}$	$(n \geq 2) \rightarrow 2$ $(n \geq 3) \rightarrow 1$ $(n \geq 4) \rightarrow 0$ $(n \geq 5) \rightarrow 0$ $\{(2,2)(3,1)(-4,0)(1,2)\}$	$(n \geq 2) \rightarrow 2$ $(n \geq 3) \rightarrow 1$ $(n \geq 4) \rightarrow 1$ $(n \geq 5) \rightarrow 1$ $\{(2,2)(3,1)(-4,1)(1,2)\}$
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$$f - g \Rightarrow n=1 \rightarrow f(1) - g(1) = 2$$

$$n=2 \rightarrow f(2) - g(2) = 2$$

$$n=3 \rightarrow f(3) - g(3) = 2$$

$$\rightarrow \{(1,2)(2,2)(3,2)\}$$

تقریباً $n=2$

$$\frac{f}{g} \rightarrow n=2 \rightarrow f(2) - g(2) = 1 \rightarrow 12$$

$$n=3 \rightarrow -2$$

$$\rightarrow \{(2,2)(3,-2)\}$$