

1. $y = \sqrt{x f(x)} \rightarrow x f(x) \geq 0 \rightarrow$ هم علامت $x, f(x)$

$\rightarrow$ $\begin{array}{ccccccc} - & - & \checkmark & 0 & + & \checkmark & + \\ + & - & - & - & - & + & + \end{array}$ $\rightarrow D_f = [-5, 0] \cup [2, 5]$

$\checkmark$ (P)

2. $y = \sqrt{\frac{-x}{f(x)}} \rightarrow \frac{-x}{f(x)} \geq 0, f(x) \neq 0 \rightarrow$ معنی اینست $x, f(x)$ هم علامت؟

$\rightarrow$ $\begin{array}{ccccccc} + & - & \checkmark & + & \checkmark & - & - \\ - & - & + & - & - & + & + \end{array}$ $\rightarrow D_f = (-2, 0) \cup (0, 2) \rightarrow [-2, -1] \cup [1, 2]$

(P) $\checkmark$

3. $f(x) - 2f(2) = x^2 - 2x + 4 \xrightarrow{x=2} f(2) - 2f(2) = 4 - 4 + 4$

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

$\rightarrow f(-2) + 4 = 12 \rightarrow f(-2) = 8$

(P) $\checkmark$

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

$f(5) = 5 - \sqrt{9} = 2 \rightarrow f(5) = 2$

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

$4+2=6$

(P) $\checkmark$

5. $a(n-1)^2 - b(n-1) + 2 - (an^2 - bn + 2) = 4n + 2$

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

$\rightarrow an^2 - 2an + a + b - an^2 = 4n + 2$

$\begin{cases} -2an = 4n \rightarrow a = -2 \\ a + b = 2 \rightarrow -2 + b = 2 \rightarrow b = 4 \end{cases} \rightarrow a - b = -2 - 4 = -6$

(P) $\checkmark$

$$\frac{r(r^r - 9 + 1) + (1 + r^r + 1)}{(r - 9 + 1)^r} = \frac{r \times 1 + 2}{(-1)^r} = \frac{r}{1} = r$$

Ⓟ ✓

$$\frac{r(1^r + 1) - r((-r)^r)}{(r + r + 1)} = \frac{r \times 1 - 1}{r} = \frac{r-1}{r}$$

Ⓟ ✓

$$f(r) = 4 / f(r) = 2 / f(r) = 1 / f(1) = 4$$

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

Ⓟ ✓

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

$$\rightarrow \frac{r+\infty}{r+1} = \frac{1}{r} = r \rightarrow \frac{1 \times \infty}{1+1} = \frac{r}{2}$$

Ⓟ ✓

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

Ⓟ ✓