

۲. رفیعی

① $(-4, -5) \rightarrow x < 0, f(x) > 0 \Rightarrow \sqrt{x}f(x) \rightarrow$ منفی X

② $(-5, 0) \rightarrow x < 0, f(x) < 0 \Rightarrow x+f(x) \rightarrow$ مثبت ✓

③ $\{0\} \rightarrow 0$ ✓ ④ $\{-5, 2, 5\} \rightarrow 0$ ✓ $D_f = [-5, 0] \cup [2, 5]$

⑤ $(0, 2) \rightarrow x > 0, f(x) < 0 \Rightarrow x+f(x) \rightarrow$ منفی X

⑥ $(2, 5) \rightarrow x > 0, f(x) > 0 \Rightarrow x+f(x) \rightarrow$ مثبت ✓

② ✓

① $[-4, -3] \rightarrow x < 0, f(x) < 0 \Rightarrow$ منفی X

② $(-3, 0) \rightarrow x < 0, f(x) > 0 \Rightarrow$ مثبت ✓

③ $(0, 2) \rightarrow x > 0, f(x) < 0 \Rightarrow$ مثبت ✓ $D_f = (-3, 2) - \{0\}$

④ $(2, 5) \rightarrow x > 0, f(x) > 0 \Rightarrow$ منفی X

⑤ $\{0\} \rightarrow 0 \rightarrow 0 \subset X$

⑥ $\{-3, 2, 5\} \rightarrow 0 \rightarrow 0 \subset X$

② ✓

$f(2) - 2f(2) = 2^2 - (2n + c) \Rightarrow -f(2) = \frac{4-4+c}{-1} = 2 \Rightarrow f(2) = -2$

~~$f(x) = x^2 - 2x + c$~~
 ~~$f(2) = 4 - 4 + c = 0 \Rightarrow c = 0$~~
 ~~$f(x) = x^2 - 2x$~~

② ✓

$f(x) + x^2 = x^2 - 2x + c \Rightarrow f(-2) = \frac{(-2)^2 - 2(-2) + c - c}{2 + 4} = \frac{10}{6} \Rightarrow f(-2) = \frac{5}{3}$

$f(f(5)) + f(f(1)) = f(2) + f(5) = \frac{2 \times 2 + 3}{2} + \frac{(5-3)}{2} = 9$

$\downarrow$
 $5 - \sqrt{5} \times 5 = 2$
 $\downarrow$
 $5 \times 1 + c = 5$

② ✓

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

$a(n^2 - 2n + 1) - b(n-1) + 2 - (an^2 - bn + 2) = -2an + (a+b) = -2n \times \frac{(a)}{1} + (a+b) = 9n + 2$

$a - b = -2 - 5 = -7$

$\downarrow$
 $a = -3$
 $\downarrow$
 $b = +4$

② ✓

$$\frac{r(r^2 - \epsilon r + 1) + (1 - \epsilon) - \frac{1}{\epsilon}(-1) + 1}{\frac{(r^2 - \epsilon r + 1)r}{\epsilon - 4 + 1} = -1} = \frac{r + 1}{1} = \underline{r}$$

(P) ✓

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

(P) ✓

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

$$f(\epsilon) \rightarrow 1$$

$$f(r) \rightarrow r$$

(P) ✓

$$f(x) = \frac{x^r + \epsilon x + 1}{x^r + \epsilon x + 1} = \frac{(x^r + \epsilon x + 1) + 1}{(x^r + \epsilon x + 1) + 1} = \frac{(x + r)^r + 1}{(x + r)^r + 1} = \frac{(r - r + r)^r + 1}{(r - r + r)^r + 1} = \frac{r^r + 1}{r^r + 1} = \underline{1}$$

$$f(r) = \frac{(r + r)^r + 1}{(r + r)^r + 1} = \frac{r^r + 1}{r^r + 1} = \underline{1}$$

(P) ✓

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

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

(P) ✓