

$$1) D_f y=8 \rightarrow y = \sqrt{f(x) - x + 1}$$

14,5

بازرس عباسی

$$\text{if } f(n) = \begin{cases} 2n-1 & ; [n] > 4 \\ \varepsilon n + 3 & ; [n] \leq 4 \end{cases}$$

جواب سؤالات 4 و 1.
رو به عقب است

(2)

$$f(n) - n + 1 \geq 0$$

$$[n] > 4 \rightarrow n \geq 5$$

$$2n - 1 - n + 1 \geq 0 \rightarrow D_f = [5, +\infty)$$

$$x \geq 0 \wedge x \geq 5$$

$$[n] \leq 4 \rightarrow n < 5$$

$$\varepsilon n + 3 - n + 1 \geq 0$$

$$\varepsilon n + 4 \geq 0 \rightarrow n \geq -\frac{4}{\varepsilon}, n < 5 \rightarrow D_f = \left[-\frac{4}{\varepsilon}, 5\right)$$

$$\hookrightarrow I \cup II \rightarrow \left[-\frac{4}{\varepsilon}, 5\right) \cup [5, +\infty) \rightarrow \left[-\frac{4}{\varepsilon}, +\infty\right)$$

$$r) y = \frac{r \varepsilon n^r + r^2 n^r + 1 n n + r}{(\varepsilon n^r + \varepsilon n + 1)^r} \rightarrow \frac{r \varepsilon n^r + r^2 n^r + 1 n n + r}{(r n + 1)^r}$$

$(\varepsilon n^r + \varepsilon n + 1)^r$
 $(r n + 1)^r$
 $(\varepsilon n^r + \varepsilon n + 1)$
 $\downarrow$
 $(r n + 1)^r$

$$\Rightarrow r \varepsilon n^r + r^2 n^r + 1 n n + r$$

$$\Rightarrow r (\varepsilon n^r + r n^r + n + 1)$$

$$(r n + 1)^r$$

(1.1.1.1)

$$\frac{r (r n + 1)^r}{(r n + 1)^r} \rightarrow \frac{r}{r n + 1} \Rightarrow r n + 1 \neq 0 \rightarrow r n \neq -1$$

وقت

$$x \neq -\frac{1}{r}$$

$$D_f = \mathbb{R} - \left\{ -\frac{1}{r} \right\}$$

$$r) f(n) = \begin{cases} \frac{n^r + r n^r - n - r}{n^r - 1} ; n \neq \pm 1 \\ \frac{a n + r}{n + b} ; n = \pm 1 \end{cases}$$

(2)

$$g(n) = n + c \quad b + c = r$$

$$\rightarrow (x^r + r x^r) + (-x - r) \rightarrow x^r (n + r) - (x + r) \rightarrow (x + r) (n^r - 1)$$

$$\frac{x^r + r x^r - x - r}{x^r - 1} = \frac{(x + r) (n^r - 1)}{n^r - 1} = (x + r) = 0$$

$$n + r = n + c \rightarrow c = r$$

$$x = 1 \rightarrow \frac{a + r}{1 + b} \rightarrow \frac{a + r}{1 + b} = r \rightarrow a + r = r(1 + b) \rightarrow a = r b + 1$$

$$x = -1 = \frac{-a + r}{b - 1} \Rightarrow -1 + r = +1 \Rightarrow \frac{-a + r}{b - 1} = +1 \Rightarrow -a + r = b - 1 \Rightarrow a = r - b$$

$$r b + 1 = r - b \rightarrow b = \frac{1}{r}$$

$$b^2 + c^2 = r^2 \checkmark$$

$$\Leftarrow) f(x) = \frac{x+1}{x-c}$$

$$g(x) = \frac{x^r - 1}{x^r + ax + b} \rightsquigarrow (x+1)(x-1)$$

(r)

$$(x-c)(x-1) = x^r + \underset{\downarrow}{a}x + \underset{\downarrow}{b}$$

$$\begin{matrix} (x-1)(x-c) \\ \downarrow D_f \{-1\} \end{matrix}$$

$$a = c+1, b = c$$

$$x < \rightarrow D_f = \mathbb{R} - \{1\} \rightarrow c = \underline{1}$$

$$\left. \begin{matrix} c=1 \\ b=1 \\ a=-2 \end{matrix} \right\} \xrightarrow{+} \underline{0}$$

$$\omega) f(x) = (x+r)^r(x-1)$$

$$g(x) = f(x+1) + f(1-x)$$

(r)

$$f(x+1) \rightarrow (x+1+r)^r(x+1-1) \rightarrow (x+r)^r(x) \rightarrow (x^r - \varepsilon x^r + r)x$$

$$f(1-x) \rightarrow (1-x+r)^r(1-x-1)$$

$$\downarrow$$

$$(-x-r)^r(-x) \rightarrow (x^r + \varepsilon x^r + r)(-x)$$

$$\begin{matrix} r \\ \downarrow \\ -x^r + \varepsilon x^r \end{matrix}$$

$$\boxed{-x^r - \varepsilon x^r - r x}$$

$$\cancel{x^r - \varepsilon x^r + r x} - \cancel{-x^r - \varepsilon x^r - r x} = \underline{-1 x^r}$$

$$4) f(-1) + f(x) \rightsquigarrow f(1-x) = \begin{cases} \sqrt[3]{x} + 1 & x \leq 0 \\ \varepsilon \sqrt{x} & x > 0 \end{cases}$$

(2)

$$f(-1) \rightsquigarrow f(1-x) = f(-1)$$

$$-1 = 1-x \rightsquigarrow 1-x+1=0 \rightarrow x(1-x)=0 \\ x-x^2=0 \rightarrow x=0 \text{ or } x=1 \\ x=1$$

$$x \rightarrow 1 \rightarrow \varepsilon \sqrt{1} \rightarrow \underline{\underline{\varepsilon}} \rightsquigarrow f(-1) = \underline{\underline{\varepsilon}}$$

$$f(x) \rightsquigarrow f(1-x) = f(x)$$

$$x = 1-x \rightsquigarrow 1-x-x=0 \rightsquigarrow -x-x=0$$

$$x \rightarrow -1 \rightsquigarrow \sqrt[3]{-1} + 1 = \underline{\underline{0}} \rightsquigarrow f(x) = \underline{\underline{1}} \\ -x(1+x)=0 \\ x = -1$$

$$f(-1) + f(x) = \varepsilon + 1 = \underline{\underline{0}}$$

$$V) f(4) \rightsquigarrow f(x+\sqrt{x}) = x^x + x^x$$

$$\underbrace{(x)^x} + \underbrace{x(x)} = \underline{\underline{144}} \\ x^x + 1x \\ x^x + 1x$$

(2)

$$x + \sqrt{x} = 4 \rightarrow \boxed{x=4} \rightsquigarrow (\sqrt{x})^x + \sqrt{x} - 4 = 0$$

$$\begin{aligned} & \frac{(\sqrt{x})^x}{x} \cdot (\sqrt{x} + x) \\ & \downarrow \\ & \sqrt{x} = x \checkmark \quad \sqrt{x} = -x \text{ (not possible)} \\ & \boxed{x=4} \end{aligned}$$

$$N) f(x) = x^x + x$$

(2)

$$f(x-1) + f(1-x) \rightsquigarrow f(x-1) = (x-1)^{x-1} + x-1$$

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

$$\Rightarrow \left(\frac{x-1}{0}\right)^{x-1} + x-1 + (1-x)^{1-x} + 1-x = \underline{\underline{0}}$$

منظور سوال را متوجه نمیشم حاصلش برای $2f - g$ نوشته
 باشد مصفا شده بازه اس؟ چه؟ $2f(1) - g(1) = 4$
 روی نمودار

یعنی تنها نقطه مشترک در دامنه توابع f و g $n=1$ است

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$$2f - g = \{(1, 4)\}$$

$$4a - \frac{b}{r} - k = 0$$

$$2f - g \rightsquigarrow \left. \begin{array}{l} 2f(x) = 2\sqrt{2x-3} + 2k - 2 \\ g(x) = \sqrt{b-4x} + 3k \end{array} \right\} \begin{array}{l} 2\sqrt{2x-3} - \sqrt{b-4x} - k - 2 \\ \sqrt{b-4x} + 3k \end{array}$$

10) $f(x) = \sqrt{m-x} + n$

$$g(x) = \sqrt{2x+2}$$

$$D_{f \times g} = [-1, 7] \rightsquigarrow$$

$$f - g(x) = 4\sqrt{2}$$

$$m+n=8$$

$$f - g(x) = 4\sqrt{2} \rightarrow f(3) - g(3) = 4\sqrt{2}$$

$$g(3) = \sqrt{2(3)+2} = 2\sqrt{2}$$

$$f(3) = \sqrt{m-3} + n \xrightarrow{m=8} \sqrt{8-3} + n = 1+n$$

$$1+n - 2\sqrt{2} = 4\sqrt{2} \rightarrow n = 1 + 6\sqrt{2}$$

$$m+n = 8 + 1 + 6\sqrt{2} - 1 \rightarrow 8 + 6\sqrt{2}$$

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9. اشتراك دامنه f و g فقط $a=1$ است يعني:

$$D_f = \left[\frac{a}{f}, +\infty \right) \quad D_g = (-\infty, \frac{b}{f}] \xrightarrow{\cap} \{1\}$$

$$\frac{a}{f} = \frac{b}{f} = 1 \rightarrow a = \frac{f}{f} \quad b = f$$

$$f(1) - g(1) = k \rightarrow 2k - 2 - 2k = k \rightarrow k = -1$$

$$a - \frac{b}{f} = k = 1$$

$$D_g = [-1, +\infty) \quad D_f = (-\infty, m]$$

-10

$$D_g \cap D_f = [-1, v] \Rightarrow m = v$$

$$(f-g)(x) = x+n - 2\sqrt{x} = 4\sqrt{x} \rightarrow n = 4\sqrt{x} - x$$

$$m+n = 4\sqrt{x} - x$$