

19,8

تساوي جبري

تعريف

$$f(x) = \left(\frac{1}{x}\right)^{x-1} - 1$$

$$y = \sqrt{x^3 f(x+1)}$$

$$D_y = ?$$

①

$$\hookrightarrow f(x+1) = \left(\frac{1}{x+1}\right)^{x+1} + 1 = (x+1)^{-(x+1)} - 1$$

$$x^3 \times (x^{1-x} - 1) \geq 0 \Rightarrow 1-x=0 \Rightarrow x=1$$

$$\begin{array}{c} 0 \quad 1 \\ -\frac{1}{x} + \frac{1}{x} - \\ \hline \end{array} \Rightarrow x^{1-x} - 1$$

$$D_y = [0, 1]$$

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$$f(x) = \sqrt{x + |x+1|}$$

$$f(-x) \rightarrow D = ?$$

②

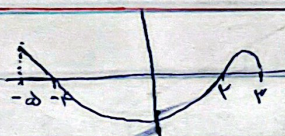
$$\hookrightarrow f(-x) = \sqrt{-x + |1-x|} \Rightarrow -x + |1-x| \geq 0 \cdot |1-x| \geq x$$

$$1-x \geq x \Rightarrow x \leq \frac{1}{2} \Rightarrow x \leq 1$$

$$D_f = (-\infty, 1]$$

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$$1-x \leq -x \Rightarrow x \leq 0$$



$$y = \sqrt{\frac{x-1}{f(x)}} \Rightarrow \frac{x-1}{f(x)} \geq 0$$

$$\frac{x-1}{f(x)} \geq 0$$

③

$$x-1=0 \Rightarrow x=1$$

$$f(x)=0 \rightarrow x=1, -1$$

$$D_f = (-1, 1] \cup (1, \infty)$$

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$$y_1 = \frac{1}{x^2 f - \sqrt{x^2 - f}} - \frac{1}{x^2 f + \sqrt{x^2 - f}}$$

$$y_2 = \frac{1}{x^2 f + a + b}$$

$$D_{y_1} = D_{y_2}$$

④

$$\sqrt{(a+b)} = ?$$

$$x^2 f - \sqrt{x^2 - f} = x^2 f - \sqrt{x^2 - f} + 1 - (x^2 f + \sqrt{x^2 - f}) = (x^2 f - 1)^2 - (x^2 f)^2 \neq 0$$

$$x^2 f - 1 = x^2 f$$

$$x^2 f - x^2 f = 0$$

$$x^2 f - a - b = x^2 f + a + b$$

$$a = -1$$

$$b = -f$$

$$\sqrt{-\left(\frac{1-f}{-f}\right)} = \sqrt{f} = \pm \sqrt{f}$$

$$f(x) = x^2 + x$$

$$y = \sqrt{f(x) - f\left(\frac{f}{x}\right)}$$

$$D_y = ?$$

⑤

$$x^2 + x - \left(\frac{f}{x}\right)^2 - \frac{f}{x} \geq 0$$

$$x^2 + x \geq \frac{4f}{x^2} + \frac{f}{x}$$

$$x^2 - \frac{4f}{x^2} \geq \frac{f}{x} - x$$

$$(x - \frac{f}{x})(x^2 + \frac{4f}{x^2} + f) + x - \frac{f}{x} \geq 0$$

$$(x - \frac{f}{x})(x^2 + \frac{4f}{x^2} + f + 1) \geq 0$$

$$\hookrightarrow \frac{(x^2 + 4f + 2x^2 f)}{x^2} \geq 0 \rightarrow x \neq 0$$

$$\begin{array}{c} -f \quad 0 \quad f \\ -\frac{1}{x} + \frac{1}{x} - \frac{1}{x} + \end{array}$$

$$D_y = [-f, 0) \cup (f, +\infty)$$

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$$f(x^n) = x^n - 1$$

$$f(r) + f(10) = ?$$

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$$x^n + n = r \rightarrow (1)^n + 1 = r \Rightarrow n = 1$$

$$x^n + n = 10 \rightarrow (r)^n + r = 10 \Rightarrow n = r$$

$$f(r) + f(10) = \frac{r(r)}{r} - 1 + \frac{r(r)}{1} - 1 = 1 + 1 = 2$$

$$f(n) = x^n - 9n^2 + 12n$$

$$g(n) = x^n + 9n^2 + 12n$$

$$\frac{g(\sqrt{r}-r)}{f(\sqrt{r}+r)}$$

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$$f(\sqrt{r}+r) = (r+1+9\sqrt{r}+12\sqrt{r}) - 9(\sqrt{r}+r) + 12(\sqrt{r}+r) = 10 - 9r + 12r = 10 + 3r$$

$$g(\sqrt{r}-r) = (r-1-9\sqrt{r}+12\sqrt{r}) + 9(\sqrt{r}-r) + 12(\sqrt{r}-r) = -10 + 11 - 11 = -10$$

$$\frac{g(\sqrt{r}-r)}{f(\sqrt{r}+r)} = \frac{-10}{10} = -1$$

$$f(n) = \sqrt{n+r} + \sqrt{n-r}$$

$$g(n) = \sqrt{n-r} + \sqrt{n+r}$$

$$n \geq r \Rightarrow f(n) + g(n) = a + b\sqrt{n+c}$$

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$$\frac{a+b}{c} = ?$$

$$f(n) = \sqrt{(n-r)+r} + \sqrt{n-r} \rightarrow f(n) = \sqrt{n-r} + r \rightarrow f(n) = |\sqrt{n-r} + r|$$

$$g(n) = \sqrt{(n-r)-r} + \sqrt{n-r} \rightarrow g(n) = |\sqrt{n-r} - r|$$

$$n \geq r \rightarrow \sqrt{n-r} + r + \sqrt{n-r} - r = 0 + 2\sqrt{n-r}$$

$$f(n) + g(n) = a + b\sqrt{n+c}$$

$$0 + 2\sqrt{n-r} = a + b\sqrt{n+c}$$

$$\frac{a+b}{c} = \frac{0+r}{-r} = -\frac{1}{r}$$

$$f(n) = \frac{n+r}{n^2 - r^2 + r^2} \quad g(n) = \left\{ (r, 1) (1, 0) (r, 2) (0, r) \right\}$$

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$$\frac{g}{f} = \left\{ \left(r, \frac{1}{-r} \right) \left(1, \frac{0}{r} \right) \left(r, \frac{2}{r} \right) \left(0, \frac{r}{r} \right) \right\} \Rightarrow \frac{g}{f} = \left\{ \left(r, \frac{1}{-r} \right) (0, 1) \right\}$$

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

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

$$f(1) = \frac{1}{1-1+1} = 1 \quad f(0) = \frac{0}{0-1+1} = 0$$

$$f(n) = \left\{ (1, r) (r, -1) (r, 2) (-1, 4) \right\} \quad g(n) = \left\{ (-r, r) (1, -1) (r, 2) (-1, 0) \right\}$$

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$$الف) f(r) = \left\{ \left(\frac{1}{r}, r \right) \left(\frac{r}{r}, -1 \right) (r, 2) \left(-\frac{1}{r}, 4 \right) \right\}$$

$$ب) f(r) = \left\{ (1, r) (\sqrt{r}, -1) (r, 2) \right\}$$

$$ج) f(r) + 1 = \left\{ (-r, 1) (1, 3) (r, 9) (-1, 1) \right\}$$

$$د) \frac{f}{g} = \left\{ \left(1, \frac{r}{-1} \right) \left(r, \frac{-r}{r} \right) \left(-1, \frac{1}{r} \right) \right\} \Rightarrow \left\{ (1, -r) (r, -1) \right\}$$

مقسوم

$$\rightarrow n = 1, 3, -1$$

$$\left. \begin{array}{l} 2. r = 1 \rightarrow x = \pm 1 \\ 2. r = r \rightarrow x = \pm r \\ 2. r = r \rightarrow x = \pm r \\ 2. r = -1 \rightarrow x \end{array} \right\}$$

$$\rightarrow \left\{ (\pm 1, r) (\pm \sqrt{r}, -1) (\pm r, r) \right\}$$