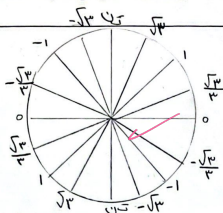


نام و نام خانوادگی شماره کلاس پاسخنامه تشریحی تکلیف شماره ۲



۲

۱) $\sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{3\pi}{4} \rightarrow \sin 45^\circ + \cos 180^\circ + 2 \tan 135^\circ = \frac{1}{\sqrt{2}} - 1 + 2 \times (-1) = -\frac{3}{\sqrt{2}}$

ب) $-\cos \frac{5\pi}{4} + \sin \frac{3\pi}{4} - 3 \sin \frac{\pi}{4} \rightarrow -\cos 135^\circ + \sin 45^\circ - 3 \sin 45^\circ = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 3 \times \frac{\sqrt{2}}{2} = -\frac{\sqrt{2}}{2}$

ج) $\cot \frac{3\pi}{4} + 2 \cot \frac{\pi}{4} - 2 \tan \frac{\pi}{4} \rightarrow \cot 135^\circ + 2 \cot 45^\circ - 2 \tan 45^\circ = -\frac{1}{\sqrt{2}} + \frac{2}{\sqrt{2}} + 2 \times \frac{1}{\sqrt{2}} = \frac{3}{\sqrt{2}}$

د) $\cos(\sin \pi) + \sin(\pi \cos \frac{\pi}{4}) = \cos 0 + \sin(\frac{\pi}{\sqrt{2}}) = 1 + \frac{\pi}{\sqrt{2}}$

$f(x) = \begin{cases} x^2 + 2x & x > 1 \\ 2x + a + 2 & x \leq 1 \end{cases}$ $x^2 + 2x = 2x + a + 2 \rightarrow x^2 - a - 2 = 0 \rightarrow (x+1)(x-1) = 0$
 $\text{① } a = 1 - 2 = -1$
 $\text{② } a > 0 \rightarrow a = 1$

$f(1) = x^2 + 2x \rightarrow 1 + 2 = 3$

$f(x) = \begin{cases} x^2 - b & x+1 \geq 2 \\ x^2 - b & x+1 \leq -2 \\ a + 2x & -3 \leq x \leq -1 \end{cases}$ $f(x) = \begin{cases} x^2 - b & x \geq 1 \\ x^2 - b & x \leq -3 \\ a + 2x & -3 \leq x \leq -1 \end{cases}$

$a + 2x = x^2 - b \rightarrow x = -3 \rightarrow a - 4 = 1 - b \rightarrow a + b = 5$

۲) $\frac{1}{x^3 - 2x^2}$ $x^3 - 2x^2 \neq 0 \rightarrow x^2(x-2) \neq 0 \rightarrow x \neq \{0, 2\}$
 $D = \mathbb{R} - \{0, 2\}$

۳) $\frac{1}{x^2 + 2x^2 + 2x + 2} = \frac{1}{x^2(x+2) + 2(x+1)}$ $x+2 \neq 0 \rightarrow x \neq -2$
 $D = \mathbb{R} - \{-2\}$

$$y = \sqrt{x^2 - 1} + \sqrt{x - 2} \rightarrow x^2 - 1 \geq 0 \rightarrow x^2 \geq 1 \rightarrow x \geq 1$$

$$x - 2 \geq 0 \rightarrow x \geq 2 \leftarrow D = [2, +\infty)$$

$$\Rightarrow y = \frac{\sqrt{4 - 3x}}{\sqrt{4x - 3}}$$

$$4 - 3x \geq 0 \rightarrow 3x \leq 4 \rightarrow x \leq \frac{4}{3}$$

$$4x - 3 > 0 \rightarrow 4x > 3 \rightarrow x > \frac{3}{4}$$

$$\left. \begin{matrix} x \leq \frac{4}{3} \\ x > \frac{3}{4} \end{matrix} \right\} \Rightarrow D = \left(\frac{3}{4}, \frac{4}{3} \right]$$

$$y = \sqrt{4x - a} + \sqrt{b - 3x}$$

$$4x - a = 0 \rightarrow x = \frac{a}{4} \rightarrow x \geq \frac{a}{4}$$

$$b - 3x = 0 \rightarrow x = \frac{b}{3} \rightarrow x \leq \frac{b}{3}$$

$$\frac{a}{4} = 2 \rightarrow a = 8$$

$$\frac{b}{3} = 2 \rightarrow b = 6$$

$$\left. \begin{matrix} a = 8 \\ b = 6 \end{matrix} \right\} \Rightarrow D = \left[\frac{a}{4}, \frac{b}{3} \right] = [2, 2] = \{2\}$$

$$y = \frac{x^2 - 13x^2 + 4}{x^2 - 13x^2 + 4}$$

$$x^2 - 13x^2 + 4 = (x^2 - 4)(x^2 - 9) \rightarrow x = \pm 2, \pm 3$$

$$x^2 - 9 = 0 \rightarrow x = \pm 3$$

$$x^2 - 4 = 0 \rightarrow x = \pm 2$$

$$D = (-\infty, -3) \cup (-2, 2) \cup (3, +\infty)$$

$$y = \frac{x^2 - 13x^2 - 4x + 4}{x^2 + 2x^2 - 5x - 4}$$

$$x^2 - 13x^2 - 4x + 4 = (x - 2)(x - 1)(x + 3)$$

$$x^2 + 2x^2 - 5x - 4 = (x - 2)(x + 1)(x + 3)$$

$$D = (-\infty, -3) \cup (-2, -1) \cup (1, 2) \cup (3, +\infty)$$

$$y = \sqrt{2[x] - 8}$$

$$2[x] - 8 \geq 0 \rightarrow 2[x] \geq 8 \rightarrow [x] \geq 4 \Rightarrow D = [4, +\infty)$$

$$y = \sqrt{2[x] - 4}$$

$$2[x] - 4 \geq 0 \rightarrow 2[x] \geq 4 \rightarrow [x] \geq 2 \Rightarrow D = [2, +\infty)$$

$$y = \sqrt{\frac{x+1}{|x-2|}} + \sqrt{\frac{4-x}{x^2+2x+8}}$$

$$4 - x \geq 0 \rightarrow x \leq 4$$

$$\Delta = 8 - 16 = -8 < 0$$

$$D = [-1, 4] - \{2\}$$

$$[x] - 8 \geq 0 \rightarrow [x] \geq 8 \Rightarrow D = [8, +\infty)$$

$$2 - [x] \geq 0 \rightarrow [x] \leq 2 \Rightarrow D = (-\infty, 2]$$

$$\left. \begin{matrix} D = [8, +\infty) \\ D = (-\infty, 2] \end{matrix} \right\} \Rightarrow D = \emptyset$$