

$$y = \frac{n^2 - 4n}{n^2 - n} \geq 0 \quad \frac{n(n-4)}{n(n-1)} \geq 0 \quad D_f = (-\infty, 0) \cup (0, 1) \cup (4, +\infty)$$

$$y = \frac{n^2 - n^2}{n^2 - n} \geq 0 \quad \frac{n^2(\frac{1}{n} - 1)}{n^2(\frac{1}{n} - 1)} \geq 0 \quad D_f = (0, 1) \cup (1, +\infty)$$

$n \neq 0 \quad n \neq 1 \quad n \geq 0$

1)

$$y = \frac{n+1}{\sqrt{n+1+n}} \quad |n|+n > 0 \quad n < 0 \quad n > 0 \quad D_f = (0, +\infty)$$

$$-n+n=0 \quad n+n=2n \quad n > 0$$

$$y = \frac{1}{\sqrt{n+1+n}} \quad n|n| > 0 \quad n < 0 \quad n > 0 \quad D_f = (0, +\infty)$$

$$-n^2 < 0 \quad n > 0 \quad n^2 > 0$$

2)

$$y = \sqrt{r-|n|} \quad r-|n| > 0 \quad |n| < r \quad n < r \quad D_f = (-\infty, r)$$

$$y = \frac{1}{\sqrt{r-|n|}} \quad r-|n| > 0 \quad |n| < r \quad n < r \quad D_f = (-\infty, r)$$

3)

$$\sqrt{\left[n - \frac{1}{r}\right] + \left[n + \frac{r}{r}\right]} \quad \left[n - \frac{1}{r}\right] + \left[n + \frac{r}{r}\right] \geq 0 \quad n + \frac{r}{r} = \left(n - \frac{1}{r}\right) + 1 \quad n(n+1) > 0 \quad n > 0$$

$$n = \left[n + \frac{1}{r}\right] \quad \left[n + \frac{r}{r}\right] = n+1 \quad n+1 > 0 \quad \left[n - \frac{1}{r}\right] > 0$$

$$D_f = \left[\frac{1}{r}, +\infty\right) \quad n - \frac{1}{r} > 0 \quad n > \frac{1}{r}$$

4)

$$y = \sqrt{\left[n - \frac{1}{r}\right] + \left[-n + \frac{1}{r}\right]} \quad a = n - \frac{1}{r} \quad [a] + [-a] \in \mathbb{Z} \quad n - \frac{1}{r} = n$$

$$\left[n - \frac{1}{r}\right] + \left[-n + \frac{1}{r}\right] \geq 0 \quad D = \left\{n + \frac{1}{r} \mid n \in \mathbb{Z}\right\} \quad n = n + \frac{1}{r}$$

$$y = \frac{r}{\sin n - 1} \quad \sin n - 1 \neq 0 \quad n \neq \frac{\pi}{2} + 2k\pi$$

$$\sin n \neq 1 \quad D_f = \mathbb{R} - \left\{\frac{\pi}{2} + 2k\pi\right\}$$

$$y = \frac{r}{r \sin^2 n - 1} \quad r \sin^2 n - 1 \neq 0 \quad \sin n \neq \pm \frac{\sqrt{r}}{r}$$

$$r \sin^2 n \neq 1 \quad \sin n \neq \pm \frac{\sqrt{r}}{r}$$

$$\sin^2 n \neq \frac{1}{r} \quad n \neq \frac{k\pi}{r} + \frac{\pi}{2}$$

$$D_f = \mathbb{R} - \left\{\frac{\pi}{2} + \frac{k\pi}{r}\right\}$$

5)

$$y = \sqrt{x \sin x - 1}$$

$$x \sin x - 1 \geq 0$$

$$\sin x \geq \frac{1}{x}$$

$$\frac{\pi}{2} < x < \frac{3\pi}{2}$$

$$D = \bigcup_{k \in \mathbb{Z}} \left[\frac{\pi}{2} + 2k\pi, \frac{3\pi}{2} + 2k\pi \right]$$

$$y = \sqrt{x \cos x - 1}$$

$$\cos x - 1 \geq 0$$

$$\cos x \geq 1$$

$$\cos x = 1 \quad x = 2k\pi$$

$$D = \{2k\pi \mid k \in \mathbb{Z}\}$$

(9)

$$\cos y = |x| - 2$$

$$-1 \leq \cos y \leq 1$$

$$-1 \leq |x| - 2 \leq 1$$

$$1 \leq |x| \leq 3$$

$$-3 \leq x \leq -1$$

$$-1 \leq x+2 \leq 1$$

$$D = [-3, -1] \cup [1, 3]$$

$$(x+1)^2 \leq 1$$

$$-1 \leq x+1 \leq 1$$

$$-2 \leq x \leq 0$$

$$D = [-2, 0]$$

(10)

$$y = \sqrt{x - \log_r(x-2)}$$

$$x-2 > 0$$

$$x > 2$$

$$x - \log_r(x-2) \geq 0$$

$$\log_r(x-2) \leq x$$

$$x-2 \leq 2$$

$$x \leq 4$$

$$D = (2, 4]$$

(11)

$$y = \log_2(x^2 - 1)$$

$$x^2 - 1 > 0$$

$$x(x-1) > 0$$

$$x < 0 \text{ or } x > 1$$

$$D = (-\infty, 0) \cup (1, +\infty)$$

$$y = \frac{x}{x^m + 1}$$

$$x^m + 1$$

مقامه مثبت

$$D = \mathbb{R}$$

$$x^m \neq -1$$

$$x^m - 2 \neq 0 \quad m \neq \log_2 2 = 1$$

$$D = \mathbb{R} - \left\{ \frac{1}{2} \right\}$$

(12)

$$y = \frac{x}{x^m - 1}$$

$$x^m - 1 \neq 0$$

$$x^m \neq 1 \quad m \neq 0$$

$$D = \mathbb{R} - \{0\}$$

$$y = \frac{x}{x^m - 2}$$

$$x^m - 2 \neq 0$$

$$x^m \neq 2$$

$$m \neq \log_2 2$$

$$D = \mathbb{R} - \{ \log_2 2 \}$$

$$y = (x+1)!$$

صحیح نامبری

$$x+1 = n$$

$$n = 0, 1, 2, \dots$$

$$x = n-1$$

$$x = \frac{n-1}{1}$$

$$D = \left\{ \frac{n-1}{1} \mid n = 0, 1, 2, \dots \right\}$$

(13)

$$y = \left(\frac{x-2}{x-5} \right)!$$

$$\frac{x-2}{x-5} = n$$

$$n = 0, 1, 2, \dots$$

$$x-2 = n(x-5)$$

$$x-2 = nx-5n$$

$$(1-n)x = 2-5n$$

$$n = \frac{x-2}{x-5}$$

$$n = \frac{x-2}{x-5}$$

$$n = \frac{x-2}{x-5}$$

$$D = \left\{ \frac{x-2}{x-5} \mid n = 0, 1, 2, \dots \right\}$$