

خاصه اخرى تطبيق ستاره يا زهره دهنه

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1-

$$f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \rightsquigarrow \sqrt{\frac{(x-1)^2 - x^2}{x(x-1)}} \rightarrow \sqrt{\frac{x^2 + 1 - 2x - x^2}{x(x-1)}}$$

$$-x+1=0 \quad \frac{-x+1}{x(x-1)} \geq 0 \rightsquigarrow \frac{0}{+} - \frac{1}{+} + \frac{1}{+} \quad D_f = (-\infty, 0) \cup [\frac{1}{2}, 1)$$

$$x \neq -1 \quad \frac{1}{-x+1} - \frac{x}{x} \rightarrow x \neq 0$$

$$\frac{x}{x-1} + \frac{1}{x+2}$$

$$x \neq 1 \quad \frac{1}{x-1} + \frac{1}{x+2} \rightarrow \frac{x^2 + 4 + x - 1}{(x-1)(x+2)}$$

$$D_f = \mathbb{R} \setminus \{-2, -\frac{1}{2}, -1, 0, 1\}$$

$$f(x) = \sqrt{\left(\left(\frac{1}{x}\right)^x - 9\right)(3x - x^x)} \quad \left(\left(\frac{1}{x}\right)^x - 9\right)(3x - x^x) \geq 0$$

$$\left(\left(\frac{1}{x}\right)^x - 9\right) \geq 0 \rightarrow \left(\frac{1}{x}\right)^x \geq 9 \rightsquigarrow x \leq -2 \quad / \quad 3x - x^x \geq 0 \rightarrow 3x \geq x^x$$

$$x \geq \frac{3}{x} \rightarrow x^2 \geq 3 \rightarrow x \geq \sqrt{3} \quad / \quad x \leq -\sqrt{3}$$

$$\text{if } x \geq \sqrt{3} \rightarrow \left(\left(\frac{1}{x}\right)^x - 9\right)(3x - x^x) \rightarrow \text{جواب شمس} \quad D_f = (-\infty, -2] \cup [\sqrt{3}, +\infty)$$

$$\sqrt{x-1} + \sqrt{y+1} = 3 \rightsquigarrow \sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow 3 - \sqrt{x-1} \geq 0$$

$$x \geq 1 \quad \sqrt{x-1} \leq 3 \rightarrow x-1 \leq 9 \rightarrow x \leq 10$$

$$D_f = [1, 10]$$

$$f(x) = \frac{\log x}{\sqrt{x^2-1} + 1} \rightsquigarrow \frac{(x^2 - x - 2)}{(x-2)(x+1)} > 0 \quad \frac{-1}{x-2} + \frac{1}{x+1}$$

$$x^2 - 1 \geq 0 \quad \sqrt{x^2-1} + 1$$

$$x^2 > 1 \rightarrow x > 1 \quad / \quad x < -1$$

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

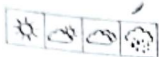
$$f(x) = \sqrt{x^2 + ax - x^2} \rightsquigarrow D_f = [-r, b]$$

$$\frac{c}{a} \geq \frac{r}{-1} \rightarrow -c \geq -r \times b \rightarrow b \geq \frac{r}{-1}$$

$$-r + (-ra) + r = 0$$

$$-ra \geq 1 \rightarrow a \leq -\frac{1}{r}$$

$$\text{MRNOTE} \quad a+b \geq \frac{r}{-1} - \frac{1}{r} \geq \frac{r}{-1} \geq 1$$



3- $f(x) = \begin{cases} x^2 - x & x > 1 \\ x + 1 & x < 1 \end{cases}$ $g(x) = \sqrt{f(x) - x} \rightarrow f(x) - x > 0$

1) $x^2 - x - x > 0 \rightarrow x^2 - 2x > 0 \rightarrow x(x-2) > 0 \rightarrow x < 0 \text{ or } x > 2$

2) $x + 1 - x > 0 \rightarrow 1 > 0$ (always true)

$\therefore x < 0 \text{ or } x > 2$

4- $f(x) = x^2 - tx$ $f(\sin \frac{\sqrt{r}}{r} + \cos \frac{\sqrt{r}}{r})$

$\hookrightarrow r(1 + \sqrt{r})^2 - t(1 + \sqrt{r}) = r + \frac{r}{r} + r\sqrt{r} - t - r\sqrt{r} = \frac{-1}{r}$

$\hookrightarrow (1 + \sqrt{r})^2 - t = \frac{-1}{r}$

5- $f(x) = \frac{x+1}{x-1}$ $f(f(a)) = a \rightarrow \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = a$

$\hookrightarrow \frac{a+1}{a-1} = a$

6- $f(x) = x^2 - tx$ $g(x) = \sqrt{x^2 - 1} \rightarrow f(g(a)) = -t$

$t^2 - ft = -t \rightarrow t^2 - ft + t = 0 \rightarrow t(t - f + 1) = 0$

$t = 0 \text{ or } t = f - 1$

$t = f - 1 \rightarrow \sqrt{a^2 - 1} = f - 1 \rightarrow a^2 - 1 = (f - 1)^2$

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

7- $f(x+y) = x^2 - ax + 4$ $x+y = 1 \rightarrow 1 - a + 4 = 5$

$x+y = -1 \rightarrow -1 - a + 4 = 3$

$f(1) \times f(-1) = 5 \times 3 = 15$

10- $f(\cos^2 x + a \cos x) = \tan^2 x$ $f(\frac{1}{r})$

$\cos^2 x + a \cos x = \frac{1}{r} \Rightarrow \cos x = t \Rightarrow t^2 + at - \frac{1}{r} = 0$

$\Delta = a^2 + \frac{4}{r} \geq 0$

$t = \frac{-a \pm \sqrt{a^2 + \frac{4}{r}}}{2}$

$\cos x = \frac{1}{r}$

$\tan^2 x = \frac{1}{r^2} - 1$