

$$y^3 - x = 2x^2 \Rightarrow y^3 = 2x^2 + x$$

$$x=0 \Rightarrow y^3=0 \Rightarrow y=0$$

$$x=-1 \Rightarrow y^3=1 \Rightarrow y=1$$

$$x=-2 \Rightarrow y^3=4 \Rightarrow y=\sqrt[3]{4}$$

$\Rightarrow$ تابع هست

یا صحنه

$$|y| + x^2 = x + 3 \Rightarrow |y| = -x^2 + x + 3$$

$$x=0 \Rightarrow |y|=3 \Rightarrow y=\pm 3$$

$\Rightarrow$ تابع نیست

$$\sqrt{x-4} + |y-2| = 0 \Rightarrow -\sqrt{x-4} = |y-2| \Rightarrow (x, y)$$

$$x=1 \Rightarrow |y-2| = -2$$

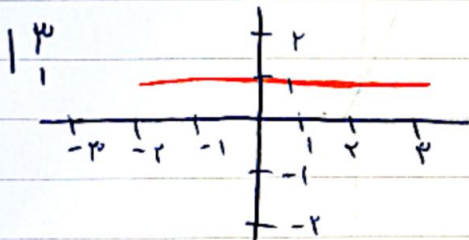
تابع هست زیرا همیشه مقدار مطلق عددی و عددی منفی ندارد.

$$x = \cos y \Rightarrow$$

تابع نیست

$$x=0 \Rightarrow y = \frac{\pi}{2}, \frac{3\pi}{2}$$

الف)



$$\Rightarrow y=1$$

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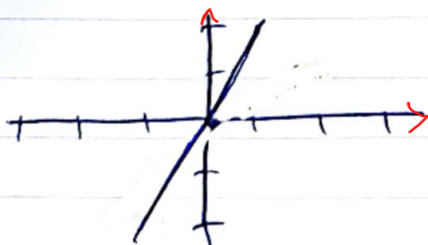
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ب)

$$y = ax + b$$

$$\Rightarrow y = 2x + b$$

$$\Rightarrow b=0 \Rightarrow y=2x$$



ا) $y = ax + b \Rightarrow y = x \Rightarrow b = 0, a = 1$

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$a + pb = 1 + p(0) = 1$ ✓

ب) $y = x^2 + ax + b$

$\text{Min} = \left| \frac{p}{1} \right| \Rightarrow p = \frac{-a}{p(1)} \Rightarrow a = \cancel{x} \Rightarrow a = -x$

$\Rightarrow 1 = \frac{-\Delta}{p(1)} \Rightarrow -\Delta = x \Rightarrow \Delta = -x$

$a + pb = \cancel{x} + 0 = 1$
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$\Delta = a^2 - 4b = -x$

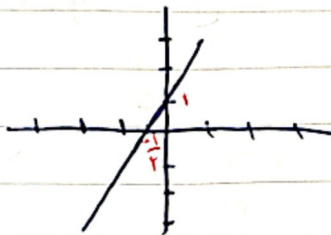
$14 - 4b = -x \Rightarrow -4b = -x - 14$

$b = \Delta$

ا) $y = px + 1$

$y = 0 \Rightarrow x = -\frac{1}{p}$

$x = 0 \Rightarrow y = 1$

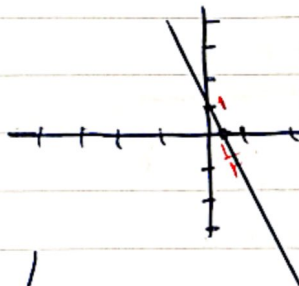


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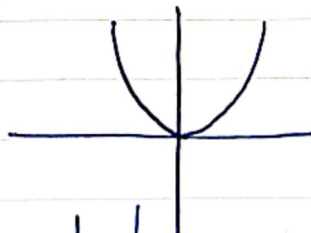
ب) $y = -px + 1$

$y = 0 \Rightarrow x = \frac{1}{p}$

$x = 0 \Rightarrow y = 1$



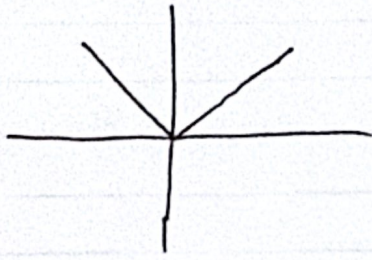
ج) $y = x^2$



د) $y = x^3$

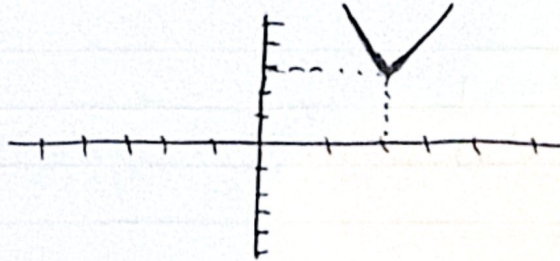


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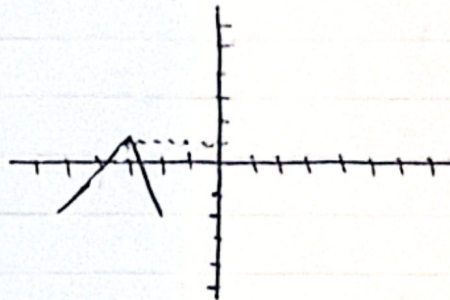


$$y = |x|$$

الف) $y = |x-2| + 3$



ب) $y = -|x+2| + 1$



الف) $y = \frac{x+2}{x^2-4x}$ = $x^2-4x \neq 0 \Rightarrow$
 $x^2 \neq 4x \Rightarrow x \neq 4, 0$

$D_f = \mathbb{R} - \{4, 0\}$

ب) $y = \frac{x+2}{x^2-7x+14}$ =

$x^2-7x+14 \neq 0$

$\Delta = 49 - 56 = -7 < 0$ $\Rightarrow$ د معنی است در همه جا دارد $D_f = \mathbb{R}$

ج) $y = \frac{x+2}{x^2+x+2}$ =

$x^2+x+2 \neq 0 \Rightarrow D_f = \mathbb{R}$

$\Delta = 1 - 8 = -7 < 0$ $\Rightarrow$ د معنی است در همه جا دارد

د) $y = \frac{x+2}{x^2-4x^2}$ =

$x^2-4x^2 \neq 0 \Rightarrow x^2 \neq 4x^2 \Rightarrow x^2 \neq 4 \Rightarrow$
 $x \neq 2, -2, 0 \Rightarrow$

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

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الف) $\sqrt{4-x} + \sqrt{x-2} =$

✓ $4-x \geq 0 \Rightarrow x \leq 4$ $x-2 \geq 0 \Rightarrow x \geq 2$
 $2 \leq x \leq 4$

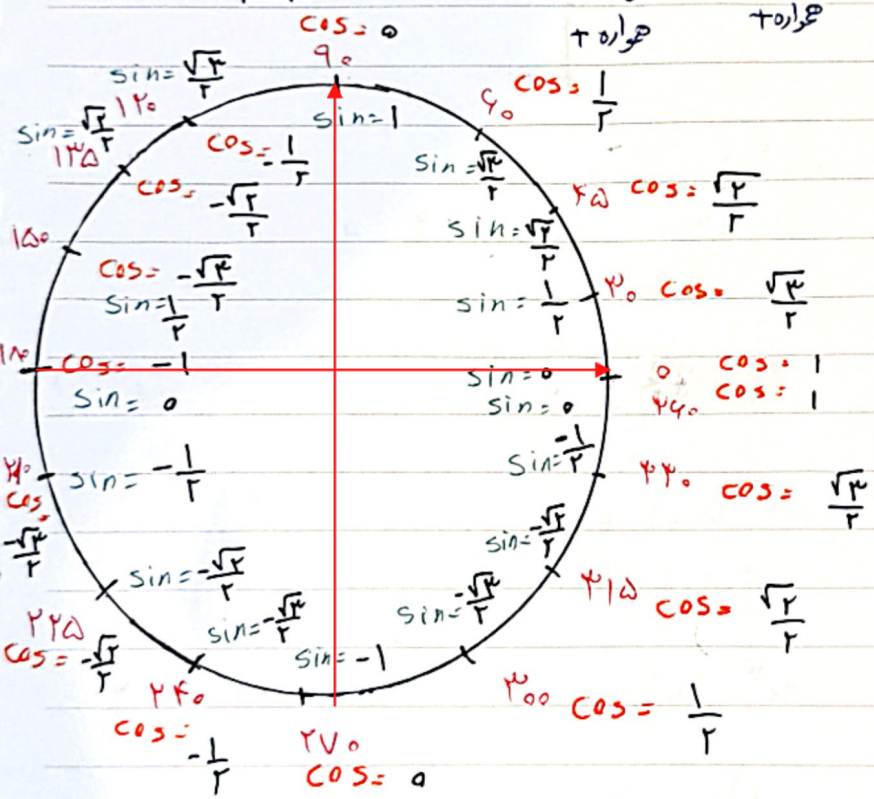
$D_f = [2, 4]$

✓ $y = \frac{x^2+1}{x^2+1} \Rightarrow x^2+1 \neq 0 \quad x^2 \neq -1 \Rightarrow$ غير ممكن
 $D_f = \mathbb{R}$

✓ $y = \frac{\sqrt{x-2}}{x-2} \Rightarrow x-2 \geq 0 \Rightarrow x \geq 2$
 $x-2 \neq 0 \Rightarrow x \neq 2$

$D = [2, +\infty) - \{2\}$

✓ $y = \frac{x^2+3}{\ln(x^2+1)} \Rightarrow \ln(x^2+1) \neq 0 \Rightarrow x^2+1 \neq 1 \Rightarrow x \neq 0$
 $D_f = \mathbb{R} - \{0\}$



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الف) $-(\cos 150^\circ) = \frac{1}{2} \Rightarrow \frac{\sqrt{3}}{4}, \frac{\sqrt{3}}{4}$ ✓

ب) $-(\cos 225^\circ) = -\frac{\sqrt{2}}{2} \Rightarrow \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}$



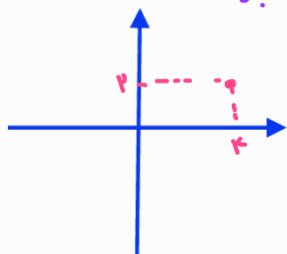
الف) $y^3 - x = 2x^2$

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تعریف ریاضی $\rightarrow \left. \begin{matrix} y_1^3 = x_1 + 2x_1^2 \\ y_2^3 = x_2 + 2x_2^2 \end{matrix} \right\} \xrightarrow{x_1 = x_2} \begin{matrix} y_1^3 = x + 2x^2 \\ y_2^3 = x + 2x^2 \end{matrix} \rightarrow y_1^3 = y_2^3 \Rightarrow \underline{\underline{y_1 = y_2}}$ تابع است.

ج) $\underbrace{|x-4|}_{x=4} + \underbrace{|y-2|}_2 = 0$

$\mathbb{Z} = \{(4, 2)\}$



مجموع دو عبارت مانتفا برابر صفر شده ، پس هر دو عبارت صفر است.

تابع است.