

$$f = \{(1, 4a), (1, a^2 + 3), (2, 3a)\}$$

تابع بودن رابطه به درازای x یک y

$$a^2 + 3 = 4a$$

$$1 \frac{a^2}{a} - \frac{4a}{b} + \frac{3}{c} = 0$$

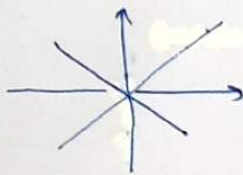
$$a + b + c = 0 \rightarrow x = 1$$

$$\rightarrow x = \frac{c}{a} = 3$$

$$x=1 \rightarrow \{(1, 4), (1, 4), (2, 3)\} \checkmark$$

$$x=3 \rightarrow \{(1, 12), (1, 12), (2, 9)\} \checkmark$$

الف) $|y| = |x| \rightarrow y = \pm |x| \rightarrow y = x$
 $y = -x$



تابع نیست
 در خط قائم بیش از دو بار
 قطع می کنند

ب) $|y| + \sqrt{x-1} = 0$

هر دو عبارت همواره نامنفی به صفر



تابع است ✓

الف) $|y-1| = \sqrt{x-2}$

تابع نیست
 $x=3 \rightarrow |y-1| = 1 \rightarrow y-1 = 1 \rightarrow y = 2$
 $y-1 = -1 \rightarrow y = 0$

ب) $y^5 - y = \frac{x^2}{y}$

$x=0 \rightarrow y^5 - y = 0 \rightarrow y(y^4 - 1) = 0 \rightarrow y(y^2 - 1)(y^2 + 1) = 0$

تابع نیست
 0 1 -1

ج) $\sin^2 x + \cos^2 \frac{y}{2} = 1$

$x=0 \rightarrow \sin^2 0 = 0 \rightarrow \cos^2 \frac{y}{2} = 1$

$\rightarrow \cos \frac{y}{2} = 1 \rightarrow y = 0$ تابع نیست

$\rightarrow \cos \frac{y}{2} = -1 \rightarrow y = 2\pi$

د) $2xy = x$

$x(2y-1) = 0$

$x=0$ برای هر مقادیری y مقدار است

تابع نیست

الف) $x^2 + |y-1| = 4x$

درازای x دو y
 $x=1 \rightarrow 1 + |y-1| = 4 \rightarrow |y-1| = 3 \rightarrow y-1 = 3 \rightarrow y = 4$
 $y-1 = -3 \rightarrow y = -2$ تابع نیست

ب) $y^5 + 3x = 0$

if $(x_1, y_1) \in f$ } $x_1 = x_2$

if $(y_1, y_2) \in f$ } $y_1 = y_2$

$y_1^5 + 3x_1 = 0$

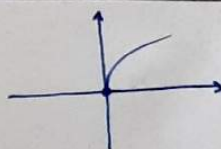
$y_2^5 + 3x_2 = 0$

$x_1 = x_2$

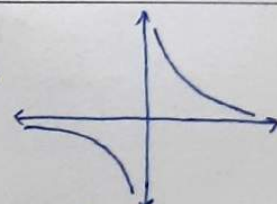
$y_1^5 = y_2^5 \rightarrow y_1 = y_2$

تابع است

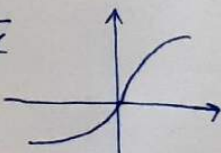
الف) $y = \sqrt{x}$



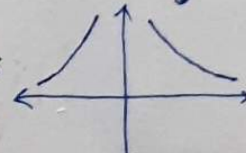
ج) $y = \frac{1}{x^3}$ فرد



ب) $y = \sqrt{x}$ فرد



د) $y = \frac{1}{x^3}$ زوج

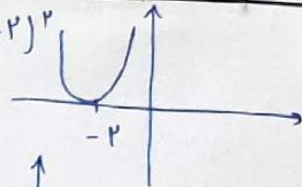


$$y = x^2$$

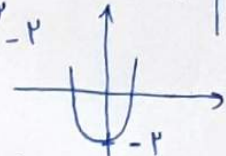

الف) $y = (x-1)^2$



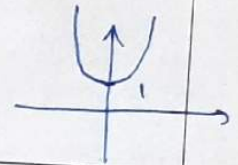
ب) $y = (x+2)^2$



ج) $y = x^2 - 2$



د) $y = x^2 + 1$



$$y = \sqrt{x}$$



الف) $y = -\sqrt{x}$

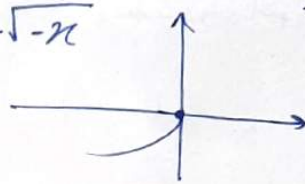


ب) $y = \sqrt{-x}$

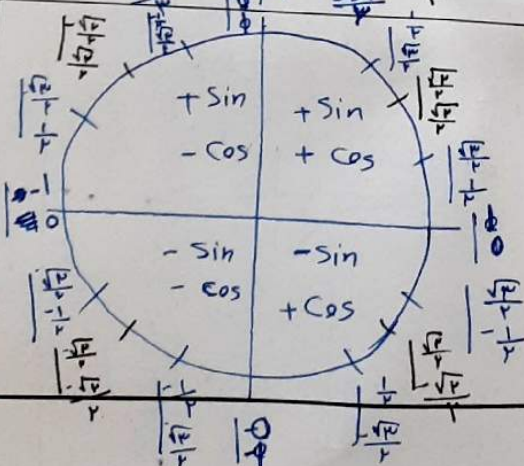
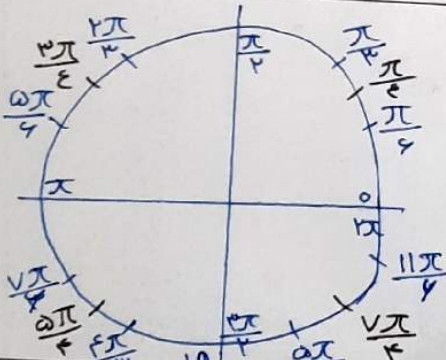
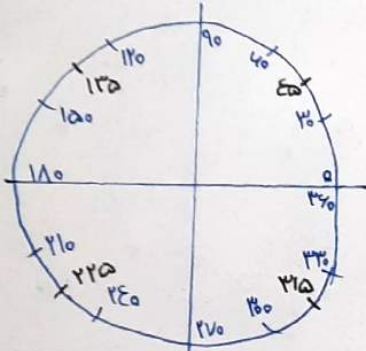
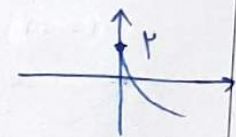
نسبت به محور ها
قرینه



ج) $y = -\sqrt{-x}$



د) $y = -\sqrt{x} + 2$



الف) $\cos 120^\circ = -\frac{1}{2}$

د) $\sin \frac{11\pi}{6} = -\frac{1}{2}$

ب) $\sin 180^\circ = 0$

ج) $\cos \frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$