

الف $y^3 - x = 2x^2 \rightarrow \begin{cases} y^3 = 2x^2 + x \\ y^2 = 2x^2 + x \end{cases} \begin{cases} y^3 = y^2 \\ y = y^2 \end{cases}$ تابع است

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②

ب $|y| + x^2 = x + 3 \xrightarrow{x=1} |y| + 1 = 1 + 3 \rightarrow |y| = 3 \rightarrow y = \pm 3$ تابع نیست

ج $\sqrt{x-4} + |y-1| = 0 \rightarrow \sqrt{x-4} = -|y-1|$
 $\sqrt{x-4} \geq 0$ و $-|y-1| \leq 0$ پس $\sqrt{x-4} = 0$ و $-|y-1| = 0$
 $x-4=0 \rightarrow x=4$ و $|y-1|=0 \rightarrow y=1$
 $\Rightarrow$ تنها یک نقطه است $(4, 1)$
 $\Rightarrow$ تابع نیست

د $x = \cos y$

اگر $x=0$ بدست می آید برای مقادیر $\frac{\pi}{2}$ و $\frac{3\pi}{2}$ بدست می آید

تابع نیست

الف $y = \frac{x+4}{x^2-4x} \rightarrow x^2-4x \neq 0 \rightarrow x^2 \neq 4x \rightarrow x \neq 4 \rightarrow Df = R - \{4\}$
 $x(x-4) = 0 \rightarrow x=0$
 $x=4$

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ب $y = \frac{x+4}{x^2-4x}$

$Df = R$

$x^2-4x+14 \rightarrow \Delta = b^2-4ac \rightarrow 16-4(14) = -40 < 0$
 $\Rightarrow$ دلتا منفی است پس جواب ندارد $\Delta = -40$

ج $y = \frac{x+4}{x^2-4x}$

$Df = R$

$x^2+x+4 \rightarrow \Delta = b^2-4ac \rightarrow 1-16 = -15 < 0$
 $\Rightarrow$ منفی $\Delta = -15$

د $y = \frac{x+4}{x^2-4x}$

$x^2(x^2-4) \neq 0 \rightarrow x \neq 0$
 $x \neq \pm 2$
 $Df = R - \{0, -2, 2\}$

الف $y = \sqrt{4-x} + \sqrt{x-2}$

$\begin{cases} 4-x \geq 0 \rightarrow x \leq 4 \\ x-2 \geq 0 \rightarrow x \geq 2 \end{cases} \rightarrow 2 \leq x \leq 4$

$Df = [2, 4]$

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ب $y = \frac{x^2+1}{x^2+1}$

$x^2+1 \neq 0 \rightarrow x^2 \neq -1$
 $Df = R$

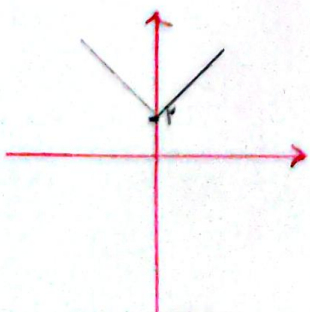
ج $y = \frac{\sqrt{x-2}}{x-4}$

$\begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ x-4 \neq 0 \rightarrow x \neq 4 \end{cases} \rightarrow Df = [2, +\infty) - \{4\}$

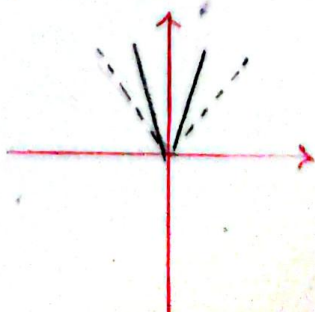
د $y = \frac{2x+3}{|x|+x^2}$

$|x|+x^2 \neq 0 \rightarrow |x| \neq -x^2$
 $x \neq 0$
 $Df = R - \{0\}$

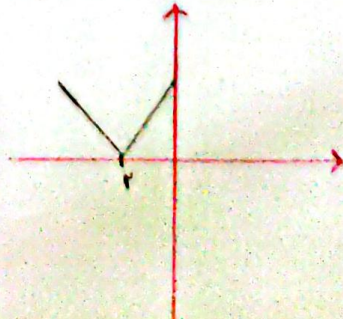
الف $y = |x| + 2$



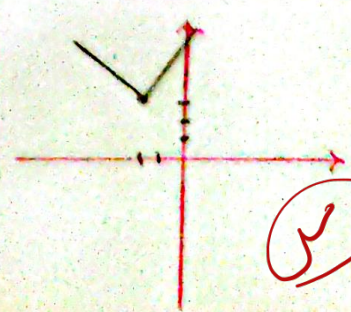
ب $y = 2|x|$



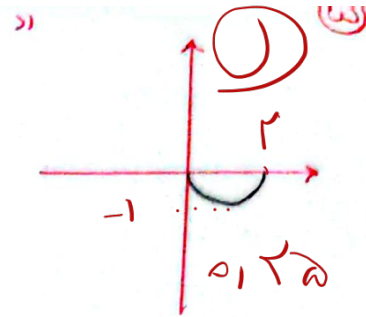
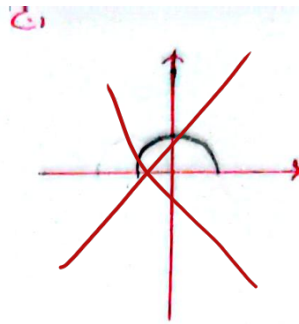
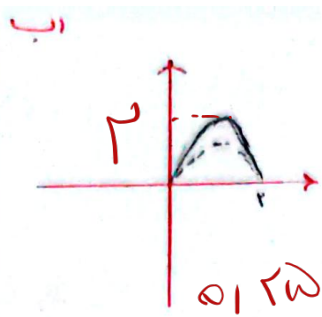
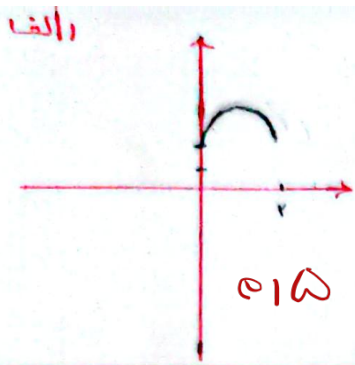
ج $y = |x+2|$



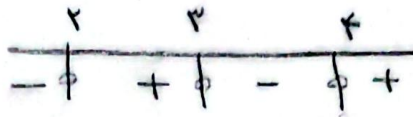
د $y = |x+2| + 3$



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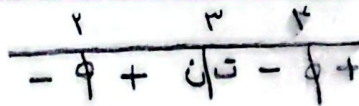
الف) $y = (x-2)(x-3)(x-4)$
 $x=2 \quad x=3 \quad x=4$



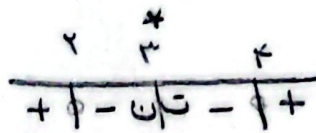
ب) $y = (x-2)(x-3)^2(x-4)$
 $1 \quad 2 \quad 3 \quad 4$



الف) $y = \frac{(x-2)(x-4)}{x-3}$
 $x=2 \quad x=3 \quad x=4$



ب) $y = \frac{(x^2-1)(x-4)}{(x-3)^2}$
 $x=1 \quad x=3 \quad x=4$

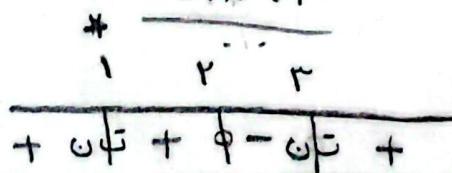


الف) $y = \frac{x^3-3x+2}{x^2-4}$
 $x=-2 \quad x=1 \quad x=2$
 $(x+2)(x-1)^2$
 $x-2$

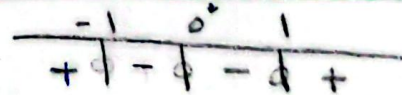


$x^3-3x+2 \mid x-1$
 $-x^3-x^2$
 x^2-3x+2
 $-x^2-x$
 $-2x+2$
 $-2x+2$
 0
 $(x+2)(x-1)^2$

ب) $\frac{x^3-3x+2}{x^2-4} = \frac{(x-2)(x-1)^2}{(x-2)(x+2)}$
 $x=1 \quad x=2$

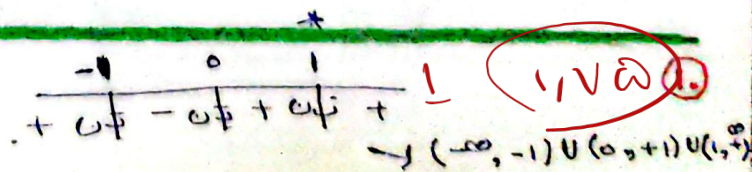


الف) $\frac{x^2-x}{x^2+x+2} = \frac{x^2(x-1)}{x^2+x+2} \rightarrow x^2(x-1)(x+1)(x-1)$
 $x=0 \quad x=-1 \quad x=1$



ب) $\frac{x^2+x+2}{x^2+x+2} \rightarrow$ همیشه مثبت
 $\Delta = 9-14 = -5 < 0$
 $\Delta = 4-12 = -8 < 0$

الف) $\sqrt{\frac{x^2-1}{x^2-x}}$
 $\frac{x^2-1}{x^2-x} \geq 0$
 $\frac{(x-1)(x+1)}{x(x-1)} \geq 0$
 $x=0 \quad x=1$



ب) $y = \sqrt{\frac{x^2-14}{x^2-5x+4}}$
 $x=0 \quad x=4$
 $(x-1)(x-4)$

