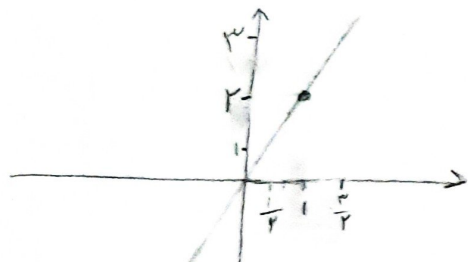


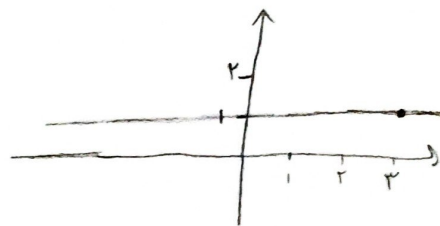
الف) $\begin{cases} y_1^3 = 2x_1^2 + x_1 \\ y_2^3 = 2x_2^2 + x_2 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2 \rightarrow \text{تابع است}$

ب) تابع نیست $y=3 \rightarrow |y|=3 \xrightarrow{x=0} |y| = -x^2 + x + 3 \rightarrow |y| = 3 \rightarrow x^2 - x = 0 \rightarrow x=0 \text{ و } x=1$

تابع است $y=2 \rightarrow |y-2|=0 \rightarrow x=4 \text{ و } x=0 \rightarrow \sqrt{x-4}=0 \rightarrow x=4$ در عبارت که هیچ کدام نمی‌توانند منفی باشند با صفر برابر شده اند پس تابع نیست $y=40^\circ \text{ و } y=300^\circ \rightarrow x = \frac{1}{2} \text{ اگر } x = \cos y \rightarrow y = 60^\circ$



ضابطه: $y = 2x$



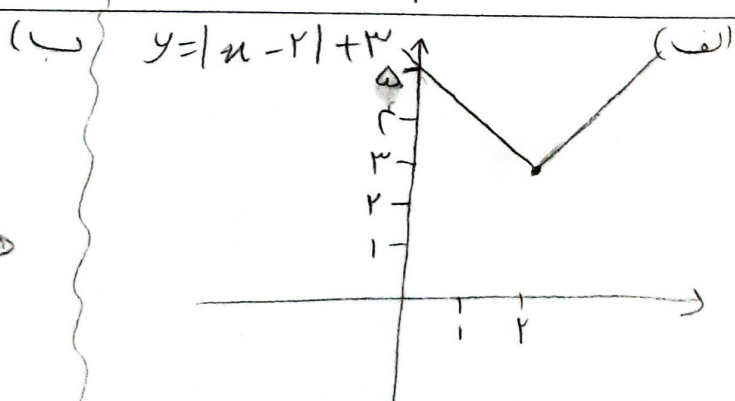
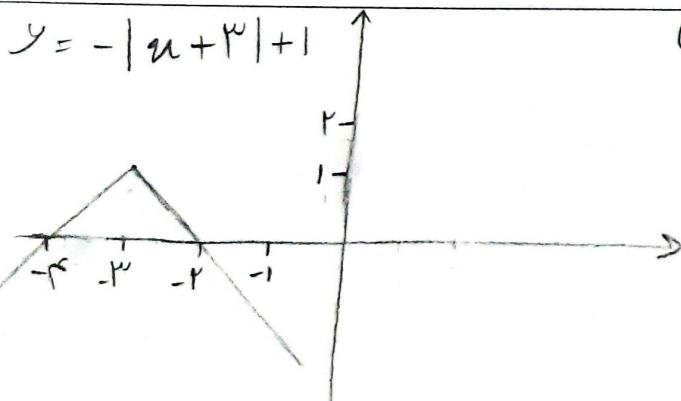
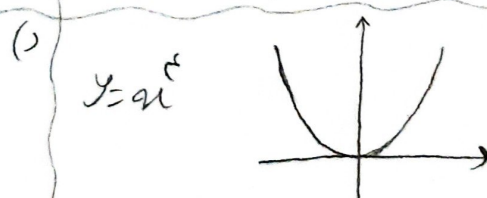
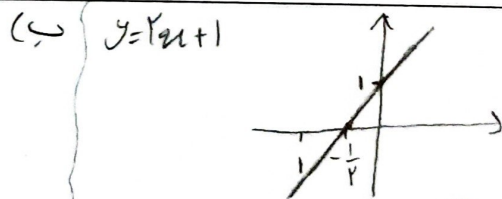
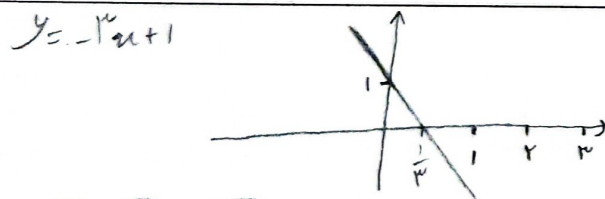
ضابطه: $y = 1$

الف) $a=1 \text{ و } b=0 \rightarrow$ یک خط با شیب ۱ و عرض از مبدأ صفر است

$a + 2b = 1 + (2 \times 0) = 1$

ب) $x^2 + ax + b \rightarrow x = -\frac{a}{2} = 2 \rightarrow a = -4 \rightarrow$

$2 + (-4)(2) + b = 1 \rightarrow b = 5 \rightarrow a + 2b = -4 + (2)(5) = 6$



الف) $x^2 - 4x \neq 0 \Rightarrow x(x-4) \neq 0 \Rightarrow x \neq 0, x \neq 4 \Rightarrow D_f = \mathbb{R} - \{0, 4\}$

ب) $x^2 - 4x + 4 \rightarrow \Delta = 4^2 - 4 \times 1 \times 4 = 0 \rightarrow D_f = \mathbb{R}$

ج) $x^2 + x + 4 \rightarrow \Delta = 1^2 - 4 \times 1 \times 4 = -15 < 0 \rightarrow D_f = \mathbb{R}$

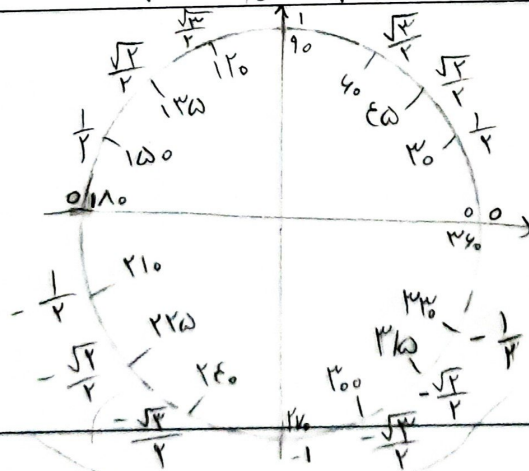
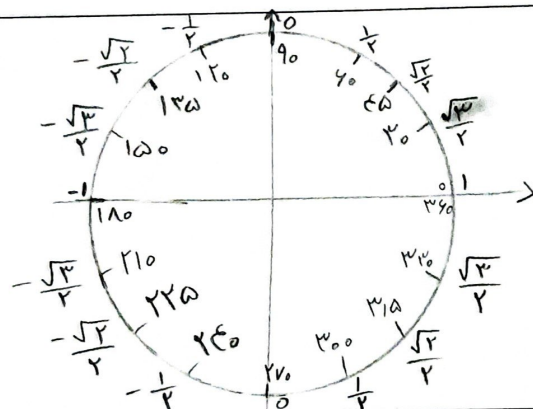
د) $x^4 - 4x^2 \rightarrow x^2(x^2 - 4) \rightarrow x^2(x-2)(x+2) \rightarrow x \neq 0, x \neq 2, x \neq -2$
 $D_f = \mathbb{R} - \{0, 2, -2\}$

الف) $x - x \geq 0 \rightarrow x \leq 4, x - 2 \geq 0 \rightarrow x \geq 2 \rightarrow D_f = \{2, 3, 4, 5, 6\}$

ب) $x^2 + 1 \neq 0 \Rightarrow x^2 \neq -1 \rightarrow D_f = \mathbb{R}$

ج) $x - 2 \geq 0 \rightarrow x \geq 2, x - 4 \neq 0 \rightarrow x \neq 4 \rightarrow D_f = [2, 4) \cup (4, +\infty)$

د) $|x| + x^2 \neq 0 \rightarrow x \neq 0 \rightarrow D_f = \mathbb{R} - \{0\}$



الف) $-\cos \frac{2\pi}{3} \rightarrow -\cos 120^\circ = -(-\frac{1}{2}) = \frac{1}{2} \rightarrow \sin 150^\circ, \sin 30^\circ \rightarrow \sin \frac{5\pi}{6}, \sin \frac{\pi}{6}$

ب) $-\cos \frac{11\pi}{6} \rightarrow -\cos 330^\circ = -\frac{\sqrt{3}}{2} \rightarrow \sin 240^\circ, \sin 120^\circ \rightarrow \sin \frac{4\pi}{3}, \sin \frac{2\pi}{3}$

$\sin \frac{4\pi}{3}, \sin \frac{5\pi}{6}$