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الف) $y' = 2x^2 - 1$
 $y_1' = 2x_1^2 - 1$
 $y_2' = 2x_2^2 - 1$
 $x_1 = x_2 \rightarrow y_1' = y_2'$
 $\Rightarrow y_1 = y_2$ تابع است ✓

۲) ✓

ب) $y' + y = 3x^2 - 1$
 $y_1' + y_1 = 3x_1^2 - 1$
 $y_2' + y_2 = 3x_2^2 - 1$
 $x_1 = x_2 \rightarrow y_1' + y_1 = y_2' + y_2$
 $y_1 - y_2 = y_2 - y_1$
 $(y_1 - y_2)(y_1' + y_1 + y_2' + y_2) = -(y_1 - y_2)$
 $\Rightarrow (y_1 - y_2)(y_1 + y_2 + y_1' + y_2') = 0$
 ① $y_1 = y_2$ ✓
 ② $y_1' + y_1 + y_2' + y_2 = 0$ تابع نیست

الف) $y = x^2 - 1$
 $y_1 = x_1^2 - 1$
 $y_2 = x_2^2 - 1$
 $x_1 = x_2 \rightarrow y_1 = y_2$ ✓ تابع است

ب) $|y| + xy = x^2 + 1$
 $y(x \pm 1) = x^2 + 1$
 $x = 2 \rightarrow \frac{y}{y} = \frac{5}{5} \Rightarrow y = \frac{5}{5}$ تابع نیست

ج) $y' + x^2 = 2x - 1 \Rightarrow y' = -x^2 + 2x - 1$ کابا
 $\Rightarrow \sqrt{y} = 2 - \sqrt{x}$
 $\Rightarrow \sqrt{y} = \dots$ تابع است
 باید بررسی به ازای x می یابیم

الف) $\tan \frac{\pi}{4} = \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{\sqrt{2}}} = \sqrt{2}$

ب) $\cos \frac{\sqrt{2}\pi}{4} = \frac{\cos \frac{\sqrt{2}\pi}{4}}{\sin \frac{\sqrt{2}\pi}{4}} = \frac{-\frac{\sqrt{2}}{2}}{-\frac{1}{\sqrt{2}}} = \sqrt{2}$

ج) $\tan \pi = \frac{\sin \pi}{\cos \pi} = \frac{0}{-1} = 0$

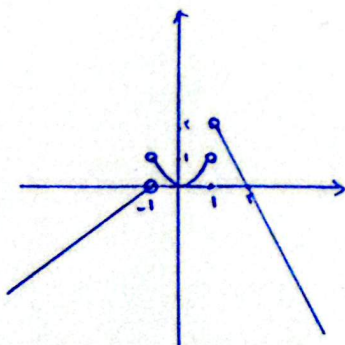
د) $\cos \pi = \frac{\cos \pi}{\sin \pi} = \frac{-1}{0}$ تعریف نشده

۲) ✓

الف) $\sin \alpha = \frac{1}{2} \Rightarrow \alpha = \frac{\pi}{6}, \frac{5\pi}{6}$

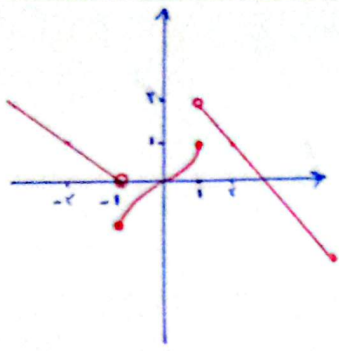
ب) $\cos \alpha = \frac{\sqrt{2}}{2} \Rightarrow \alpha = \frac{\pi}{4}, \frac{7\pi}{4}$

۲) ✓



$$f(x) = \begin{cases} -2x + 4 & x > 1 \\ x^2 & -1 < x < 1 \\ x + 1 & x < -1 \end{cases}$$

۲) ✓



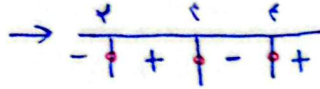
$$f(x) = \begin{cases} -x+5 & x > 1 \\ x^2 & -1 \leq x \leq 1 \\ -x-1 & x < -1 \end{cases}$$

Ⓟ ✓

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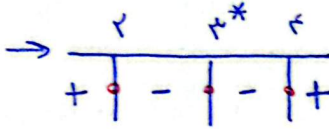
الف) $y = (x-2)(x-2)(x-4)$

$2, 2, 4$



ب) $y = (x-2)(x-2^*)(x-4)$

$2, 2^*, 4$

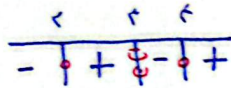


Ⓟ ✓

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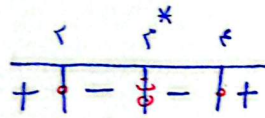
الف) $y = \frac{(x-2)(x-4)}{x-2}$

$2, 2, 4$



ب) $\frac{(x-2)(x-4)}{(x-2)^2}$

$2, 2^*, 4$

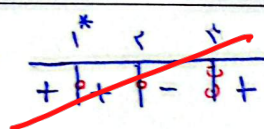


Ⓟ ✓

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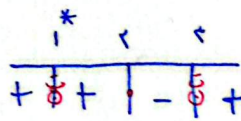
الف) $y = \frac{x^2 - 2x + 2}{x-2} = \frac{(x-1)(x+1)}{x-2}$

$1^*, 2, 2$



ب) $y = \frac{x^2 - 2x + 2}{x^2 - 2x + 2} = \frac{(x-1)(x-2)}{(x-1)(x-2)}$

$1^*, 2, 2$



Ⓟ

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

همیشه مثبت



ب) $y = \frac{x^2 + 2x + 2}{x^2 + 2x + 2} \rightarrow$ همیشه برابر

1, 1/2

10