

الف) $y^2 = 2x^2 - 1 \rightarrow y_1^2 = 2x_1^2 - 1, y_2^2 = 2x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2 \rightarrow$ تابع است

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ب) $y^2 + y = 2x^2 - 1 \rightarrow y_1^2 + y_1 = 2x_1^2 - 1, y_2^2 + y_2 = 2x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1^2 + y_1 = y_2^2 + y_2 \rightarrow y_1^2 - y_2^2 + y_1 - y_2 = 0$
 $y_1^2 + y_2 = 2x_2^2 - 1$

تابع نیست

$(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 1) = 0 \rightarrow y_1 - y_2 = 0 \rightarrow y_1 = y_2$
 $y_1^2 + y_1 y_2 + y_2^2 + 1 = 0 \rightarrow$ ریشه ندارد

الف) $y = x^2 - 1 \rightarrow y_1 = x_1^2 - 1, y_2 = x_2^2 - 1 \xrightarrow{x_1 = x_2} y_1 = y_2 \rightarrow$ تابع است

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

ج) $y^2 + x^2 = 1 \rightarrow y^2 = 1 - x^2 \rightarrow y_1^2 = 1 - x_1^2, y_2^2 = 1 - x_2^2 \xrightarrow{x_1 = x_2} y_1^2 = y_2^2 \rightarrow y_1 = y_2 \rightarrow$ تابع است

د) $\sqrt{y} + \sqrt{x} = 1 \rightarrow \sqrt{y} = 1 - \sqrt{x} \rightarrow \sqrt{y_1} = 1 - \sqrt{x_1}, \sqrt{y_2} = 1 - \sqrt{x_2} \xrightarrow{x_1 = x_2} \sqrt{y_1} = \sqrt{y_2} \rightarrow y_1 = y_2 \rightarrow$ تابع است

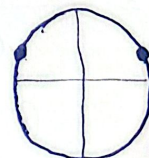
الف) $\tan \frac{\pi}{3} \rightarrow \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$ ✓ ب) $\cot \frac{\sqrt{\pi}}{6} \rightarrow \frac{\cos 11.0^\circ}{\sin 11.0^\circ} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3}$ ✓

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ج) $\tan 45^\circ \rightarrow \frac{\sin 45^\circ}{\cos 45^\circ} = \frac{\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = 1$ ✓ د) $\cot 11.0^\circ \rightarrow \frac{\cos 11.0^\circ}{\sin 11.0^\circ} = \frac{-1}{0} \rightarrow$ تعریف نشده ✓

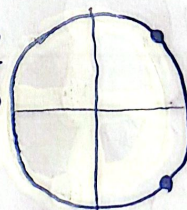
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الف) $\sin a = \frac{1}{2} \rightarrow a = \{2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$ ✓

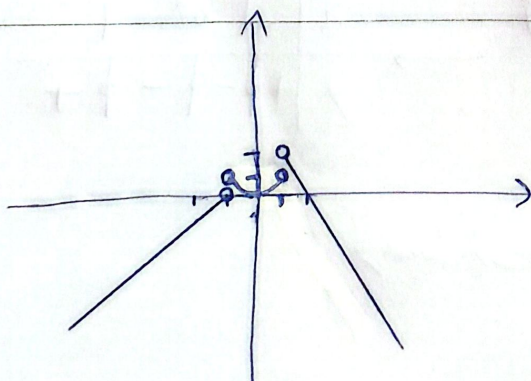


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ب) $\cos a = \frac{\sqrt{2}}{2} \rightarrow a = \{2k\pi + \frac{\pi}{4}, 2k\pi - \frac{\pi}{4}\}$ ✓

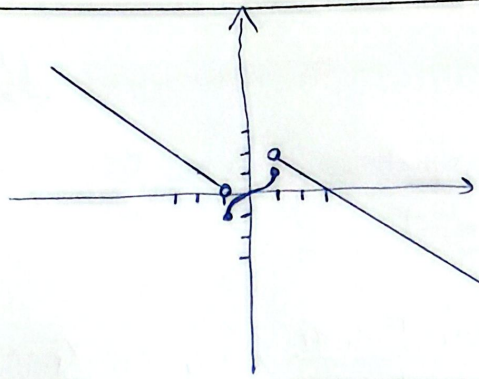


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الف) $y = (x-1)(x-2)(x-3) \rightarrow$

x	1	2	3	4
y	-	+	-	+

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

x	1	2	2*	3
y	+	-	-	+

الف) $y = \frac{(x-1)(x-3)}{x-2} \rightarrow$

x	1	2	2	3
y	-	+	-	+

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

x	1	2	2*	3
y	+	-	-	+

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

x	-1	1*	2
y	+	-	-

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

x	1*	2	2
y	+	+	-

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

x	-1	0*	1
y	+	-	-

ب) $y = \frac{x^2+2x+1}{x^2+1x+1} \rightarrow$ y دالة ثابتة $\checkmark$