

الف) $y^3 = 2x^2 - 1$

تابع است ✓

$$\left. \begin{array}{l} y_1^3 = 2x_1^2 - 1 \\ y_2^3 = 2x_2^2 - 1 \end{array} \right\} \xrightarrow{x=2} y_1^3 + 1 = y_2^3 + 1$$

$$y_1^3 - y_2^3 = 0 \rightarrow y_1 = y_2$$

ب) $y^3 + y = 3x^2 - 1$ ✓ تابع است

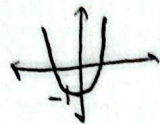
$$\left. \begin{array}{l} y_1^3 + y_1 = 3x_1^2 - 1 \\ y_2^3 + y_2 = 3x_2^2 - 1 \end{array} \right\} \xrightarrow{x=2} y_1^3 + y_1 = y_2^3 + y_2$$

$$y_1^3 - y_2^3 + y_1 - y_2 = 0 \rightarrow (y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + (y_1 - y_2) = 0$$

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

الف) $y = x^2 - 1$

$y = x^2 \rightarrow$



تابع است ✓

ب) $|y| + xy = x^2 + 1$

$x=0 \rightarrow |y| = 2 \rightarrow y = \pm 2$ تابع نیست

ج) $y^3 + x^3 = 2x - 1$

$x=1 \rightarrow y^3 + 1 = 2 - 1 \rightarrow y^3 = 0 \rightarrow y = 0$ ✓ تابع است

د) $\sqrt[3]{y} + \sqrt{x} = 2$

$x=0 \rightarrow \sqrt[3]{y} = 2 \rightarrow y = 8$ ✓ تابع است

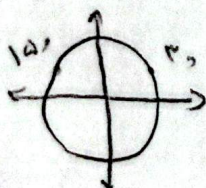
الف) $\tan \frac{\pi}{4} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$

ب) $\cot \frac{\pi}{4} = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$

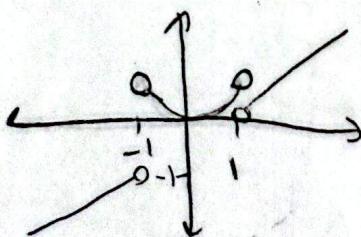
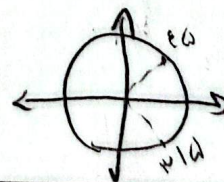
ج) $\tan 30^\circ = \frac{-\frac{1}{\sqrt{3}}}{\frac{\sqrt{3}}{2}} = \frac{2(-1)}{\sqrt{3} \times \sqrt{3}} = -\frac{2}{3}$

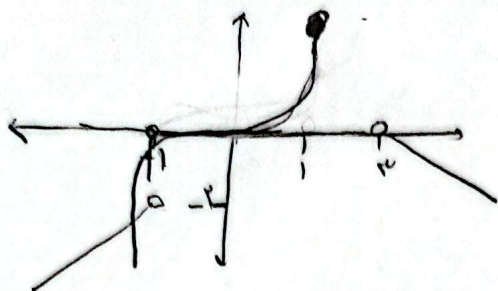
د) $\cot 180^\circ = -\frac{1}{0} = \text{undefined}$

الف) $\sin \alpha = \frac{1}{r} \rightarrow 30^\circ, 150^\circ$
 $\hookrightarrow \frac{M}{r}, \frac{AM}{r}$



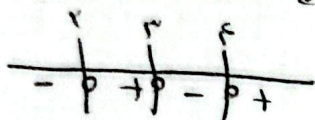
ب) $\cos \alpha = \frac{\sqrt{2}}{r} \rightarrow 45^\circ, 315^\circ$
 $\hookrightarrow \frac{M}{r}, \frac{VM}{r}$



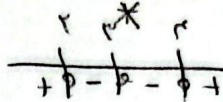


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الف) $y = (x-2)(x-3)(x-4)$

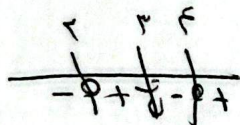


ب) $y = (x-2)(x-3)^2(x-4)$

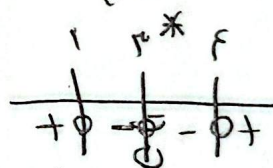


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الف) $y = \frac{(x-2)(x-4)}{x-3}$

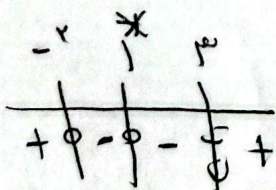


ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$

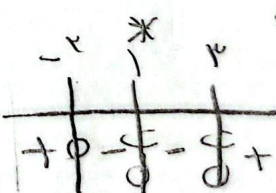


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الف) $y = \frac{x^3 - 3x + 2}{x-2} = \frac{(x-1)^2(x+2)}{x-2}$



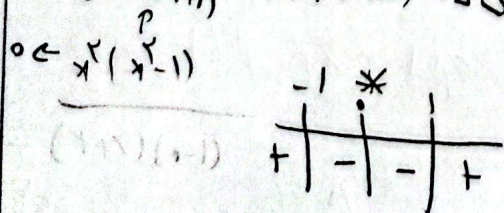
ب) $\frac{x^3 - 3x + 2}{x^2 - 6x + 8} = \frac{(x+1)^2(x+2)}{(x-1)(x-4)}$



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

مشتق $\Delta \rightarrow x^2 + x + 1$



ب) $\frac{x^2 + 3x + 2}{x^2 + 2x + 1} \rightarrow \Delta$ مشتق

مشتق $\rightarrow x^2 + 2x + 1$

$(x+1)(x+2)$

استمرار

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