

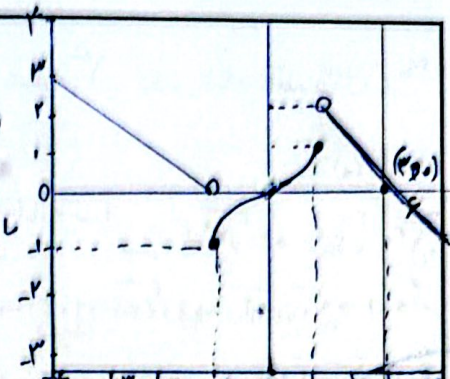
الف) $x^3 = 2x^2 - 1$ $\sqrt[3]{x^3} = \sqrt[3]{2x^2 - 1} \rightarrow x = \sqrt[3]{2x^2 - 1}$ $x = 1 \rightarrow x^3 = 1 \rightarrow 2x^2 - 1 = 1 \rightarrow 2x^2 = 2 \rightarrow x^2 = 1 \rightarrow x = \pm 1$ $f(x) = \sqrt[3]{2x^2 - 1}$ تابع است	ب) $x^3 + y = 3x^2 - 1$ $y = 3x^2 - 1 - x^3$ $y' = 6x - 3x^2 = 0 \rightarrow 3x(2 - x) = 0 \rightarrow x = 0 \text{ or } x = 2$ $x = 0 \rightarrow y = -1$ $x = 2 \rightarrow y = 3(4) - 1 - 8 = 12 - 1 - 8 = 3$ $(0, -1)$ و $(2, 3)$ تابع است	۱
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الف) $x^2 = 2x - 1$ $x^2 - 2x + 1 = 0 \rightarrow (x-1)^2 = 0 \rightarrow x = 1$ $y = 2(1) - 1 = 1$ $(1, 1)$ تابع است	ب) $x^2 + y = 2x - 1$ $y = 2x - 1 - x^2$ $y' = 2 - 2x = 0 \rightarrow x = 1$ $x = 1 \rightarrow y = 2(1) - 1 - 1 = 0$ $(1, 0)$ تابع است	ج) $x^3 + x^2 = 2x - 1$ $x^3 + x^2 - 2x + 1 = 0$ $(x-1)(x^2 + 2x - 1) = 0$ $x = 1$ or $x = -1 \pm \sqrt{2}$ تابع است	د) $\sqrt{x} + \sqrt{x} = 2$ $2\sqrt{x} = 2 \rightarrow \sqrt{x} = 1 \rightarrow x = 1$ $y = 2(1) = 2$ $(1, 2)$ تابع است	۲
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الف) $\tan \frac{\pi}{3} = \frac{y}{x} = \frac{1}{\sqrt{3}}$ $\tan \frac{\pi}{3} = \tan 60^\circ = \sqrt{3}$ $\tan 60^\circ = \sqrt{3}$ $\tan \frac{\pi}{3} = \sqrt{3}$	ب) $\cot \frac{\pi}{4} = \frac{x}{y} = 1$ $\frac{x}{y} = 1 \rightarrow x = y$ $\cot 45^\circ = 1$ $\cot 45^\circ = 1$ $\cot \frac{\pi}{4} = 1$	ج) $\tan 30^\circ = \frac{y}{x} = \frac{1}{\sqrt{3}}$ $\tan 30^\circ = \tan 30^\circ = \frac{1}{\sqrt{3}}$ $\tan 30^\circ = \frac{1}{\sqrt{3}}$ $\tan 30^\circ = \frac{1}{\sqrt{3}}$	د) $\cot 180^\circ = \frac{x}{y} = \frac{\cos \theta}{\sin \theta}$ $\cot 180^\circ = \frac{\cos 180^\circ}{\sin 180^\circ} = \frac{-1}{0}$ $\cot 180^\circ = -1$ $\sin 180^\circ = 0$ $\cot 180^\circ = \frac{1}{0}$ تابع است	۳
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الف) $\sin \alpha = \frac{1}{2}$ $\sin 30^\circ = \frac{1}{2}$ $30^\circ = \frac{\pi}{6}$ $\alpha = \frac{\pi}{6}$ $\alpha = \frac{5\pi}{6}$	ب) $\cos \alpha = \frac{\sqrt{3}}{2}$ $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $30^\circ = \frac{\pi}{6}$ $\alpha = \frac{\pi}{6}$ $\alpha = \frac{11\pi}{6}$	۴
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الف) $f(x) = \begin{cases} -2x+4 & x > 1 \\ x^2 & -1 < x < 1 \\ x+1 & x < -1 \end{cases}$ باز: $(-1, 0)$ و $(0, 1)$ بسته: $(-1, 1)$ باز: $(1, 2)$		۵
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$f(x) = \begin{cases} -x+3 & x > 1 \\ x^3 & -1 < x < 1 \\ -x-1 & x < -1 \end{cases}$ برای $x < -1$ $y = -x-1$ $x = -1$ $y = 0$ در این صورت $x < -1$ و نیز $(-1, 0)$ برای $-1 < x < 1$ $y = x^3$ $(-1, -1)$ $(0, 0)$ $(1, 1)$ برای $x > 1$ $y = -x+3$ $x = 1$ در $y = 2$ $(1, 2)$ و نیز																																	
الف) $y = (x-2)(x-3)(x-4)$ $x-2=0 \rightarrow x=2$ $x-3=0 \rightarrow x=3$ $x-4=0 \rightarrow x=4$ <table border="1" data-bbox="244 589 759 759"><tr><td>x</td><td></td><td>2</td><td></td><td>3</td><td></td><td>4</td><td></td></tr><tr><td>y</td><td>-</td><td>0</td><td>+</td><td>0</td><td>-</td><td>0</td><td>+</td></tr></table>	x		2		3		4		y	-	0	+	0	-	0	+	ب) $y = (x-2)(x-3)^2(x-4)$ $x=2$ $x=3$ $x=4$ توان زوج دارد $x=3$ و در این صورت $x=3$ و نیز <table border="1" data-bbox="860 589 1286 759"><tr><td>x</td><td></td><td>2</td><td></td><td>3</td><td></td><td>4</td><td></td></tr><tr><td>y</td><td>-</td><td>0</td><td>-</td><td>0</td><td>-</td><td>0</td><td>+</td></tr></table>	x		2		3		4		y	-	0	-	0	-	0	+
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الف) $y = \frac{(x-2)(x-4)}{x-3}$ $x-2=0 \rightarrow x=2$ $x-4=0 \rightarrow x=4$ $x-3=0 \rightarrow x=3$ <table border="1" data-bbox="244 965 759 1117"><tr><td>x</td><td></td><td>2</td><td></td><td>3</td><td></td><td>4</td><td></td></tr><tr><td>y</td><td>+</td><td>0</td><td>-</td><td>0</td><td>+</td><td>0</td><td>-</td></tr></table>	x		2		3		4		y	+	0	-	0	+	0	-	ب) $y = \frac{(x-2)(x-4)}{(x-3)^2}$ $x=2$ $x=4$ $(x-3)^2=0 \rightarrow x=3$ توان زوج دارد $x=3$ و نیز <table border="1" data-bbox="860 965 1286 1153"><tr><td>x</td><td></td><td>2</td><td></td><td>3</td><td></td><td>4</td><td></td></tr><tr><td>y</td><td>+</td><td>0</td><td>+</td><td>0</td><td>+</td><td>0</td><td>+</td></tr></table>	x		2		3		4		y	+	0	+	0	+	0	+
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الف) $y = \frac{x^2-3x+2}{x-3}$ $x^2-3x+2 = (x-1)(x-2)$ $y = \frac{(x-1)(x-2)}{(x-3)}$ $x-1=0 \rightarrow x=1$ $x-2=0 \rightarrow x=2$ $x-3=0 \rightarrow x=3$ <table border="1" data-bbox="408 1361 759 1494"><tr><td>x</td><td></td><td>1</td><td></td><td>2</td><td></td><td>3</td><td></td></tr><tr><td>y</td><td>-</td><td>0</td><td>+</td><td>0</td><td>-</td><td>0</td><td>+</td></tr></table>	x		1		2		3		y	-	0	+	0	-	0	+	ب) $y = \frac{x^2-3x+2}{x^2-4x+3}$ $x^2-3x+2 = (x-1)(x-2)$ $x^2-4x+3 = (x-1)(x-3)$ $y = \frac{(x-1)(x-2)}{(x-1)(x-3)}$ $x-2=0 \rightarrow x=2$ $x-3=0 \rightarrow x=3$ $x-1=0 \rightarrow x=1$ حذف می شود $x=2$ و $x=3$ و نیز <table border="1" data-bbox="821 1435 1185 1550"><tr><td>x</td><td></td><td>1</td><td></td><td>2</td><td></td><td>3</td><td></td></tr><tr><td>y</td><td>+</td><td>0</td><td>-</td><td>0</td><td>+</td><td>0</td><td>+</td></tr></table>	x		1		2		3		y	+	0	-	0	+	0	+
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y	-	0	+	0	-	0	+																										
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y	+	0	-	0	+	0	+																										
الف) $y = \frac{x^2-x}{x^2+x+2}$ $x^2-x = x(x-1)$ $x=0$ $x=1$ x^2+x+2 $1-1=0$ هیچ وقت صفر نمی شود <table border="1" data-bbox="295 1738 759 1870"><tr><td>x</td><td></td><td>0</td><td></td><td>1</td><td></td></tr><tr><td>y</td><td>+</td><td>0</td><td>-</td><td>0</td><td>+</td></tr></table>	x		0		1		y	+	0	-	0	+	ب) $y = \frac{x^2+3x+2}{x^2+2x+3}$ $x^2+3x+2 = (x+1)(x+2)$ x^2+2x+3 $\Delta = 2^2 - 4(1)(3) = -8$ هیچ وقت صفر نمی شود $x=-1$ و $x=-2$ <table border="1" data-bbox="885 1738 1275 1870"><tr><td>x</td><td></td><td>-2</td><td></td><td>-1</td><td></td></tr><tr><td>y</td><td>+</td><td>0</td><td>+</td><td>0</td><td>+</td></tr></table>	x		-2		-1		y	+	0	+	0	+								
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