$\frac{1-\frac{a}{3}-1+\frac{a}{1}}{2} = \frac{4a}{6} = \frac{2}{3}a$ ، $f'(x) = \frac{a}{x^2}$

$\Rightarrow x^2 = \frac{3}{2} \Rightarrow x = \pm\sqrt{\frac{3}{2}}$

شیب متوسط $= \frac{(1-\frac{a}{3})-(1-a)}{3-1} = \frac{a}{3}$

$f'(x) = \frac{a}{x^2} \rightarrow \frac{a}{3} = \frac{a}{x^2} \rightarrow x^2 = 3 \rightarrow \begin{cases} x = -\sqrt{3} & \times \\ x = \sqrt{3} & \checkmark \end{cases}$

(۱)

۲- $g'(a) = 2an^2 - 4n + 11$

$2an^2 - 4n + 11 = n \Rightarrow 2an^2 - 5n + 11 = 0$

$g'(x) = 0 \Rightarrow 4ax - 4 = 0 \Rightarrow x = \frac{3}{2a}$

$\Rightarrow 2a \times \frac{9}{4a^2} - 4 \times \frac{3}{2a} + 11a = 0 \Rightarrow -\frac{9}{2a} + 11a = 0 \Rightarrow 9 = 22a^2$

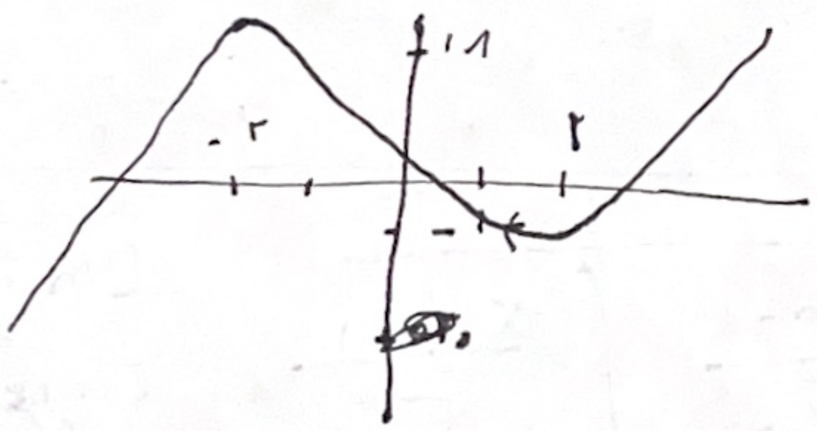
$\Rightarrow a = \pm\frac{1}{2}$ (نامنفی) $\Rightarrow a = -\frac{1}{2}$ ✓

(۲)

۳- $f'(x) = 3x^2 - 12$

$3x^2 - 12 = 0 \Rightarrow x = \pm 2$

	-2		2	
f'	$+$	0	$-$	0	$+$
f	↗	16	↘	-16	↗



min: -16 ، شیب $= 12$

(۲)

۴- $y' = 3x^2 + 2ax - 2b$

$x = -2$ ، $y = 0 \Rightarrow 12 - 4a - 2b = 0 \Rightarrow 2b = 12 - 4a$

$y' = 0 \Rightarrow 3x^2 + 2ax - 12 + 4a = 0$

$x = -2 \Rightarrow 12 - 4a - 12 + 4a = 0$ ✓

$x = \frac{-4a}{6} = -\frac{2a}{3}$ ، $y = -4$

$\Rightarrow \frac{4a^2}{9} + \frac{4a^2}{9} - \frac{4a^2}{3} + 8a + 4 = -4 \Rightarrow \frac{4a^2}{9} + 8a + 8 = 0$

$\Rightarrow a^2 + 18a + 18 = 0 \Rightarrow a = -9 \pm \sqrt{63}$

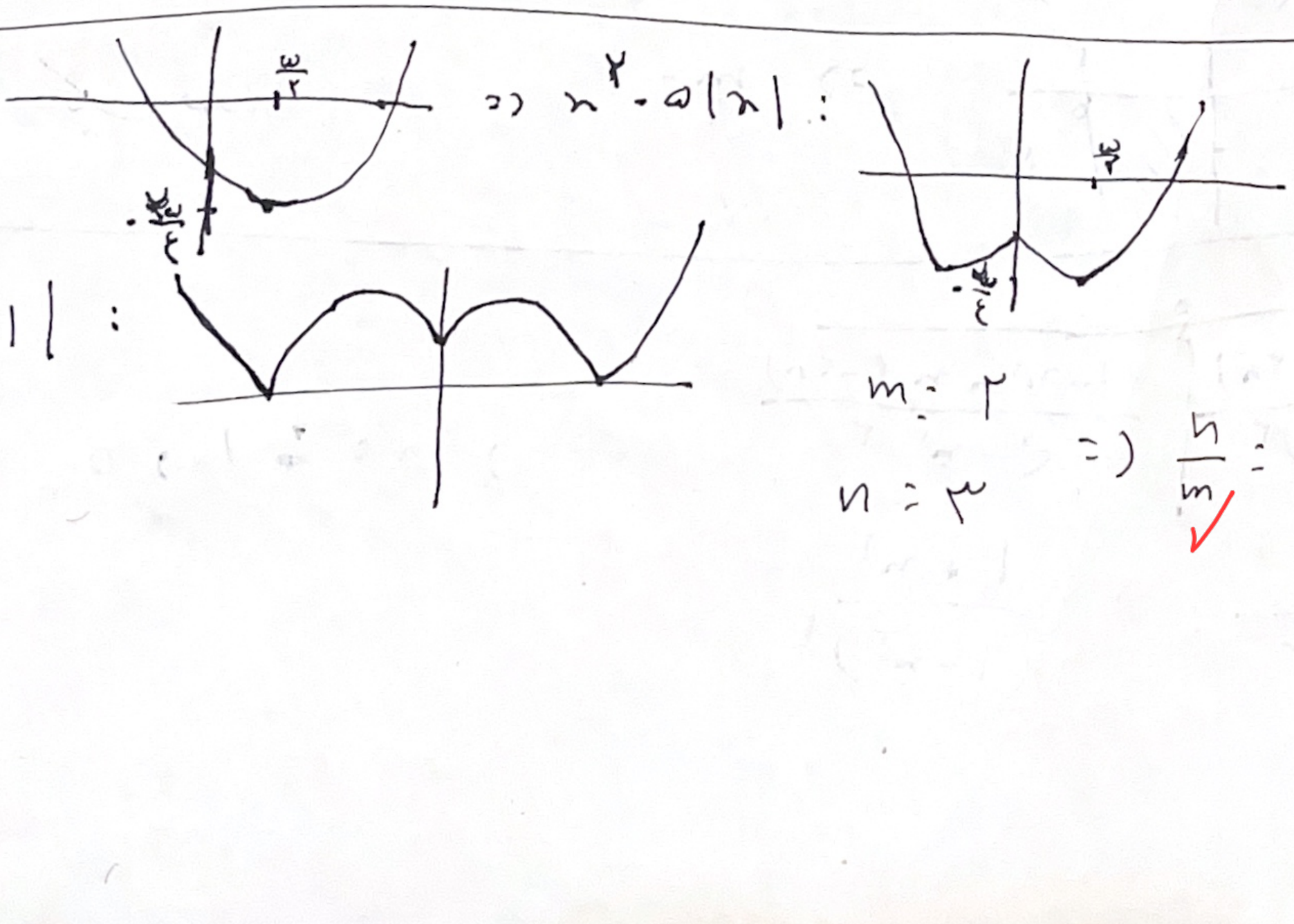
$a = -9 + \sqrt{63}$ ، $b = 15 - \sqrt{63}$

(۲)

۵- $y = |x^2 - 5|x| + 4|$

$x^2 - 5x = 0 \Rightarrow x = 0, 5$

$-x^2 + 5x = 0 \Rightarrow x = 0, -5$



$m = 4$

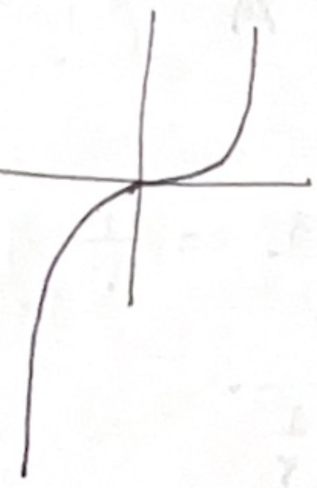
$n = 3$ $\Rightarrow \frac{n}{m} = \frac{3}{4}$ ✓

(۲)

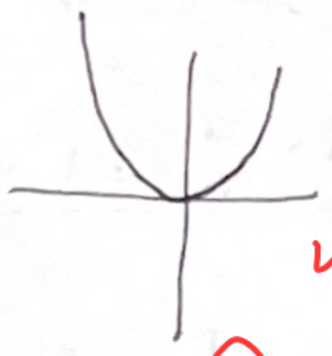
۶.

$$\frac{0}{-x^2+3x \;\Big|\; x^2+2x}$$

$\Rightarrow$ $f(x)$:



$\Rightarrow |f(x)|$:



✓

(۲)

$\Rightarrow \left|\begin{matrix}0\\0\end{matrix}\right.$: یک نقطه مجانبی

۷- $\sqrt[3]{x^2} - \frac{2}{\sqrt[3]{x}}\times(a-x) = y' \Rightarrow \frac{2a-2x}{\sqrt[3]{x}} = 0$

$\Rightarrow 2a-2x = 0 \Rightarrow 2a = 3x \Rightarrow x = \frac{2a}{3}$

$\Rightarrow \sqrt[3]{\frac{4a^2}{2a}}\left(a-\frac{2a}{3}\right) = \frac{3}{2} \Rightarrow \sqrt[3]{\frac{4a^2}{2a}}\,\frac{a}{3} = \frac{1}{2} \Rightarrow \frac{4a^2}{2a}\times a^2 = \frac{12}{8}$

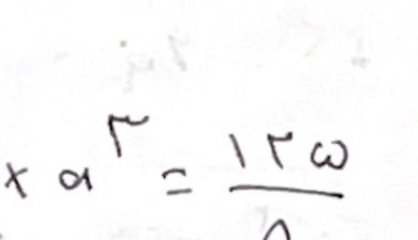
$\Rightarrow a^3 = \frac{3^3}{2^3} \Rightarrow a = \frac{3}{2}$ ✓ (۲)

$\frac{Km+n}{k-n} = \frac{4\times 10}{4-0} = \frac{4}{4} = 1$

$n=0$ $m=1$

$$\frac{0}{\sqrt{x^2-x} \;\Big|\; \sqrt{x^2-x}} \Rightarrow \frac{0}{\frac{-2x-1}{2\sqrt{x^2-x}} \;\Big|\; \frac{2x-1}{2\sqrt{x^2-x}}}$$

$\Rightarrow m=1, n=2, k=4 \Rightarrow \frac{4+2}{4-2} = 3$



$\Rightarrow$ یک مقدار

$\text{ریشه مخرج} = x = 1-m \geq 0 \rightarrow m \leq 1$ (II)

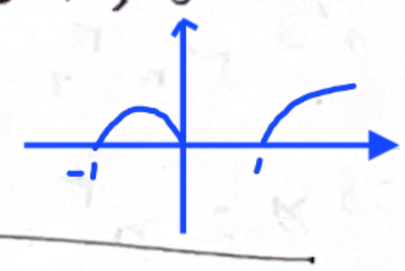
$\text{ریشه صورت} = x = -1 \rightarrow m \neq 2$ (I)

(I) $\wedge$ (II) $\rightarrow m = 0, 1$

۸- $e_{x+} : \pm\frac{1}{2}, 0$ (۱)

$e_{x-} : \pm\frac{1}{2}, 1, 0$

$y = \sqrt{2|x|-2x}$



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۹. $\frac{m(x-1+m)-mx-2}{(x-1+m)^2} > 0 \Rightarrow m^2-m-2 > 0$

$f(x) > 0 \rightarrow ad-bc > 0 \rightarrow m^2-m-2 > 0 \rightarrow (m-2)(m+1) > 0$

$\rightarrow -1 > m > 2$, $m \neq 2 \rightarrow -1 < m < 2$ (I)

-1		2
o	−	o
	//	
+		

$\Rightarrow m = 1$

(۱)

۱۰- $\frac{\frac{1-x^2-x(-2x)}{2(1-x^2)}}{\frac{1+3x^2-x(2x)}{2(1+x^2)}} \;\Big|\; \frac{0}{\frac{1+x^2}{2(1-x^2)}}$

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

$D_{f(x)} = 1-x|x| = 0 \rightarrow x|x| = 1 \rightarrow \begin{cases} x \geq 0 & x^2 = 1 \rightarrow x = 1 \checkmark \\ x < 0 & -x^2 = 1 \rightarrow x^2 = -1 \times \end{cases} \rightarrow D_f = \mathbb{R} - \{1\}$

$\rightarrow x^2 = -1 \times$

$\rightarrow x^2 = 1 \rightarrow x = -1$ ✓

یک نقطه مجانبی

$\Rightarrow x : \pm 1, 0$

(۱)