

دوازدهم لیس A

تالیف شماره ۲۷

عمران عبداللہی ۲۵

$$f(x) = \cos^3(2x) + ax^2 + b$$

$$f'(x) = -3 \cos^2(2x) \cdot \sin(2x) + 2ax$$

$$f''(x) = -12 \cos^3(2x) + 2a$$

$$f'(0) = 0$$

$$f(0) = 1 + b = 0$$

$$f''(0) = -12 + 2a = 2$$

$$\Rightarrow b = -1$$

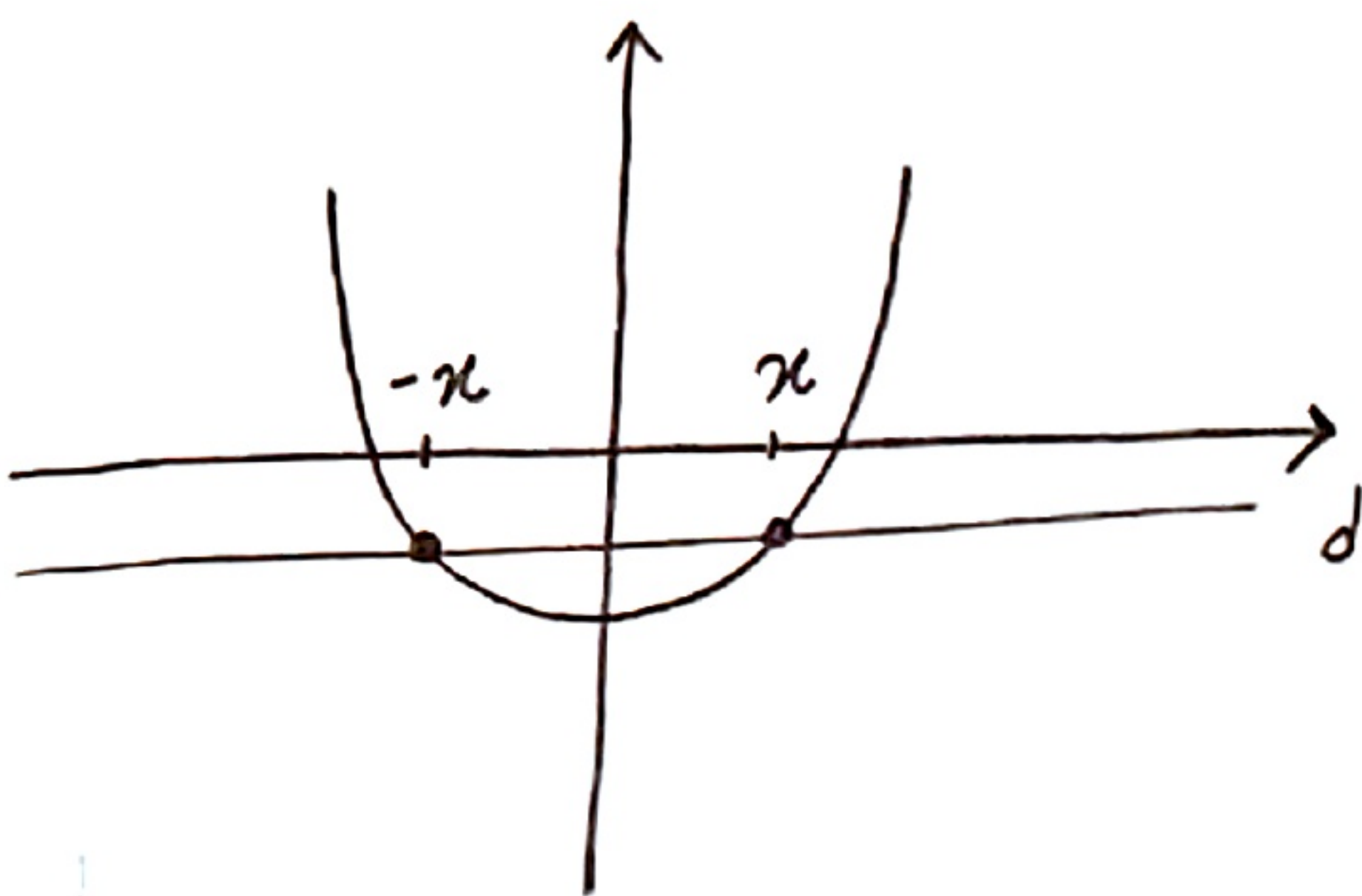
$$a = +7$$

$$\lim_{x \rightarrow 0^+} \frac{f(x)}{x} = f'(x) = 0$$

$$\lim_{x \rightarrow 0^-} \frac{f'(x)}{x} = f''(x) = 2$$

$$f(x) = 0$$

$$a + b = 6$$



$$f'(x) = 2x$$

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

$$x^2 = \frac{1}{2}$$

$$x = \frac{1}{\sqrt{2}}$$

$$f\left(\frac{1}{\sqrt{2}}\right) = -\frac{\sqrt{2}}{2}$$

$$f\left(-\frac{1}{\sqrt{2}}\right) = -\frac{\sqrt{2}}{2}$$

$$2x - \frac{\sqrt{2}}{2} = -\frac{\sqrt{2}}{2}$$

$$m = \frac{9+12}{2 \times 8 + 2 \times 8} = 9$$

$$2x_0 - 9 = \frac{a}{2x_0 - 1}$$

$$d: 2x - 9$$

$$f'(x_0) = \frac{-2a}{(2x_0 - 1)^2} = 9 \rightarrow a = -3(2x_0 - 1)^2$$

$$3(2x_0 - 3) = \frac{-3(2x_0 - 1)^2}{(2x_0 - 1)} \rightarrow x_0 = 1, a = -3$$

$$f(1) = \frac{-3}{9} = -\frac{1}{3}$$

$$f(1) = 1 + b = \frac{a+1}{a+1} = 1 \rightarrow b = -1$$

$$f'(1) = 2 = \frac{1-a^2}{(1+a)^2} = \frac{1-a}{1+a} \rightarrow a = -\frac{1}{3}$$

$$\Rightarrow a - b = \frac{2}{3}$$

$$g(x) = f(x) \rightarrow \sin x + \frac{1}{\sqrt{2}} \cos x = \frac{\sqrt{2}}{\sqrt{2}} \sin x$$

$$\cos x = \sin x \rightarrow x = \frac{\pi}{4}$$

$$f'(x) = +\cos x - \frac{1}{\sqrt{2}} \sin x = \frac{\sqrt{2}}{\sqrt{2}}$$

$$d: \frac{\sqrt{2}}{\sqrt{2}} x + b$$

$$f\left(\frac{\pi}{2}\right) = \frac{\sqrt{2}}{\sqrt{2}}$$

$$\frac{\sqrt{2}}{\sqrt{2}} \left(\frac{\pi}{2}\right) + b = \frac{\sqrt{2}}{\sqrt{2}} \rightarrow b = \frac{\sqrt{2}}{\sqrt{2}} \left(3 - \frac{\pi}{2}\right)$$

$$\frac{\sqrt{2}}{\sqrt{2}} x + \frac{\sqrt{2}}{\sqrt{2}} \left(3 - \frac{\pi}{2}\right) = 0$$

$$x = \frac{\pi}{2} - 3$$

$f'(x) = 4x^2 - 4x - 12$
 $f'(x) = 0 \Rightarrow x = \{-1, 2\}$

$A(-1, 1)$
 $B(2, -19)$

$m = \frac{1 + 19}{-1 - 2} = -9$

-6

$f'(x) = 4x^2 - 4x - 12 = -9 \rightarrow 4x^2 - 4x - 3 = 0 \quad \Delta > 0$

نقطه 2

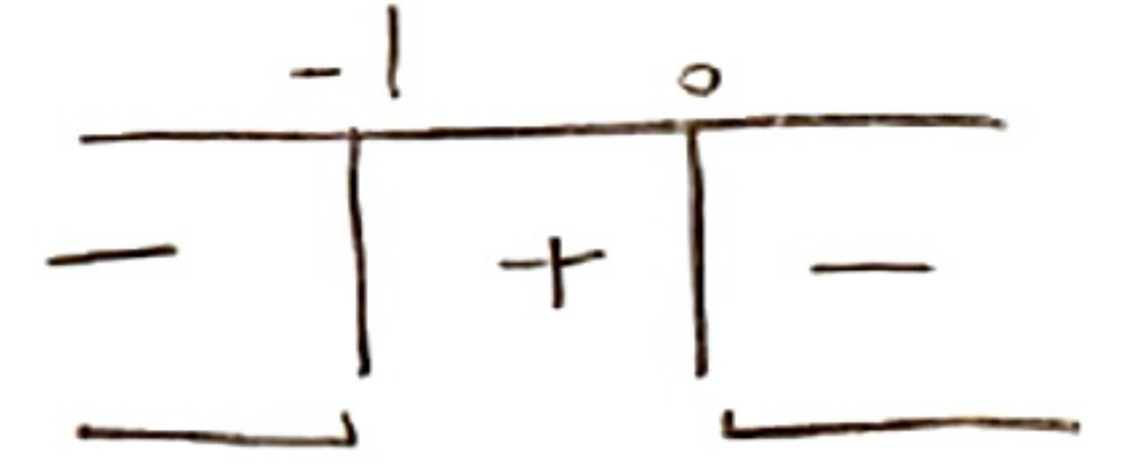
$y > 0$
 $x < 0$

$f'(x) = 3Kx^2 + 2(K+1)x \rightarrow f''(x) = 0$
 $f''(x) = 6Kx + 2(K+1)$
 $6Kx = -2(K+1)$
 $x = \frac{-(K+1)}{3K} < 0$

2

-7

$x^2(Kx + K + 1) > 0$
 $\frac{(K+1)^2}{(3K)^2} \left(-\frac{(K+1)}{3} + (K+1) \right) > 0$



$\frac{2}{3} \frac{(K+1)^2}{(3K)^2} > 0$

-	-1	0	+	+
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K هیچ مقدار صحیح منفی ندارد.

A(-1, -4) نقطه عطف

-1

$f''(-1) = 0$
 $f(-1) = -4$
 $2x + 2a = 0 \rightarrow -2 = -2a \Rightarrow a = 1$
 $-1 + 3 - b - 1 = -4 \Rightarrow b = 3$

2

$\frac{a}{b} = \frac{1}{3}$

$f(0) = 4 \rightarrow c = 4$

-9

$f'(0) = 0 \rightarrow 3x^2 + 2ax + b \rightarrow b = 0$

$f'(x_0) = 3x_0^2 + 2ax_0 = 0 \rightarrow x_0(3x_0 + 2a) = 0$
 $\rightarrow \frac{-2a}{3}$

$f\left(\frac{-2a}{3}\right) = 0$

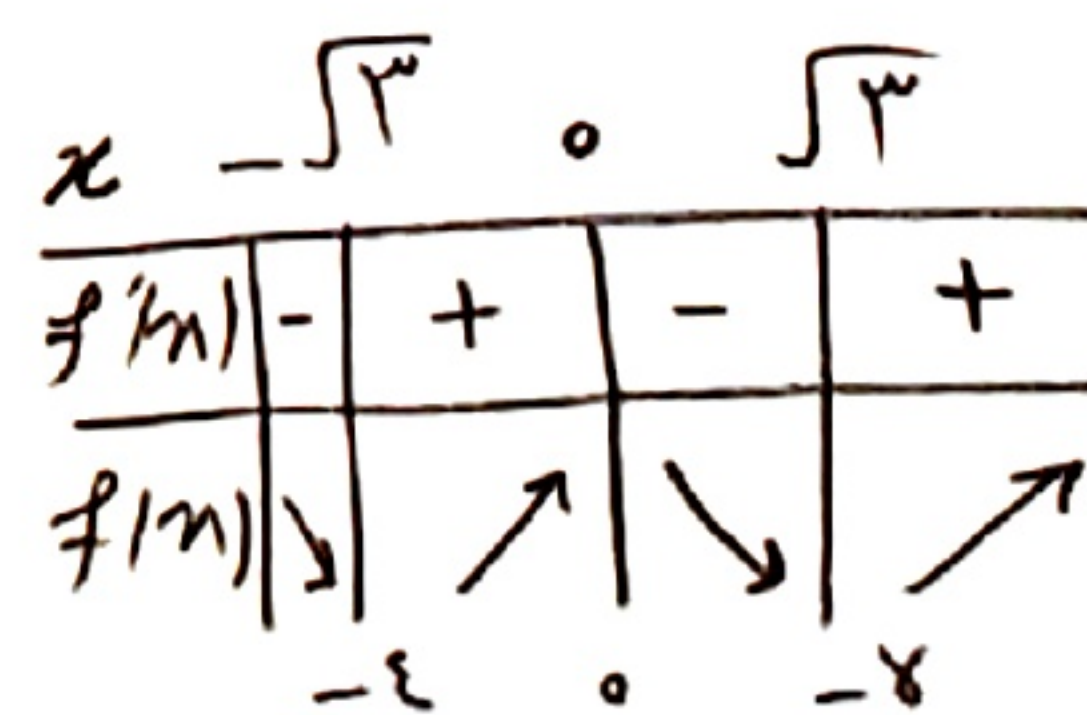
$-\left(\frac{1a^3}{27}\right) + a\left(\frac{4a^2}{9}\right) + 4 = 0 \rightarrow -4 = -\frac{1a^3}{27} + \frac{4a^3}{27} \rightarrow -4 = \frac{3a^3}{27}$
 $a = -3$

$x_0 = 2$

$f'(x) = 4x^2 - 12x$

$f''(x) = 8x - 12$

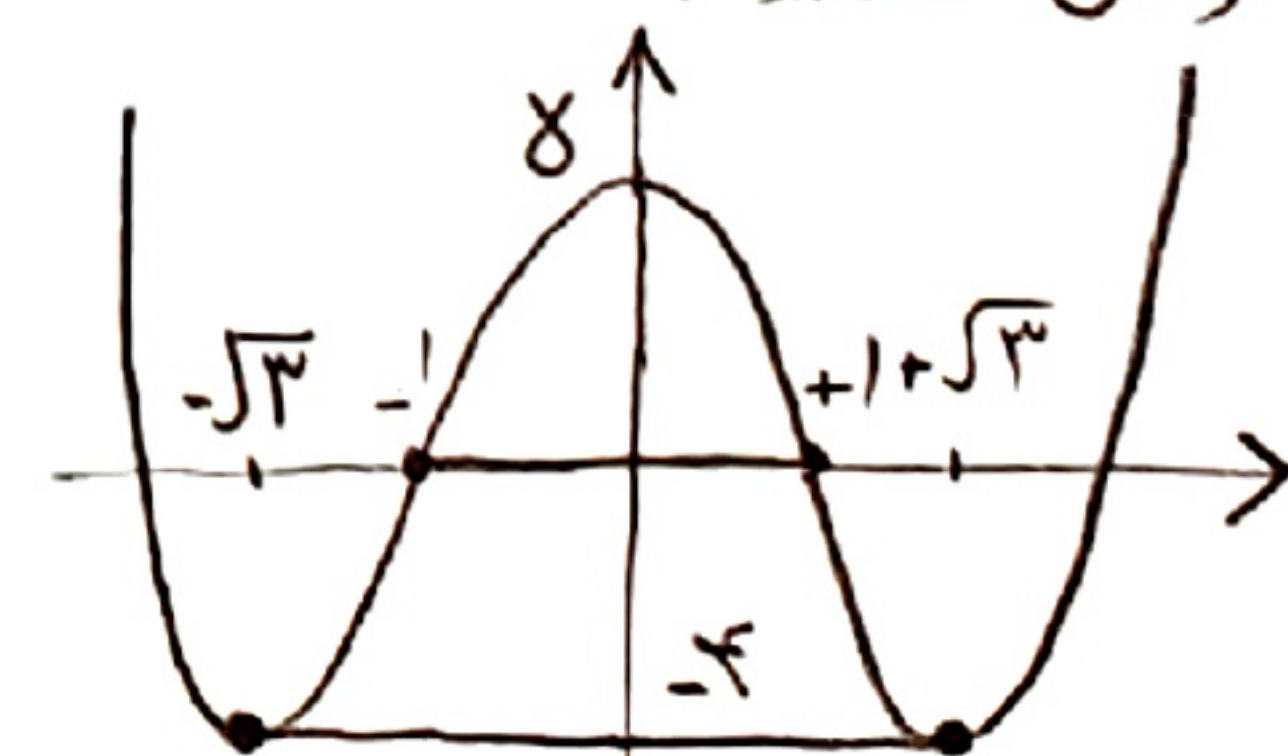
$A(\sqrt{3}, -4)$
 $B(-\sqrt{3}, -4)$
 $C(1, 0)$
 $D(-1, 0)$



← زاویه مفرد

-10

خطوط AB, CD موازی هستند.



2