$x^{2/3}(x+2)$

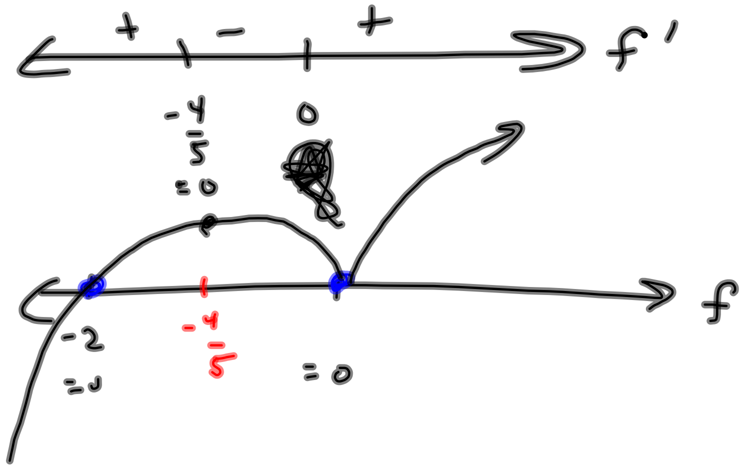
$$y' = \frac{2}{3}x^{-\frac{1}{3}}(x+2) + x^{2/3}(1)$$

$$= \frac{2(x+2)}{3x^{1/3}} + \frac{3x}{3x^{1/3}} = \frac{2x+4+3x}{3x^{1/3}}$$

$$= \frac{5x+4}{3x^{1/3}}$$

c.p.'s : $x = -\frac{4}{5}, 0$

$\quad\quad\quad\; =0 \quad \nexists$

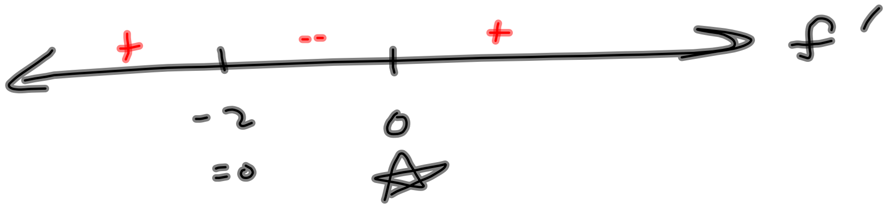


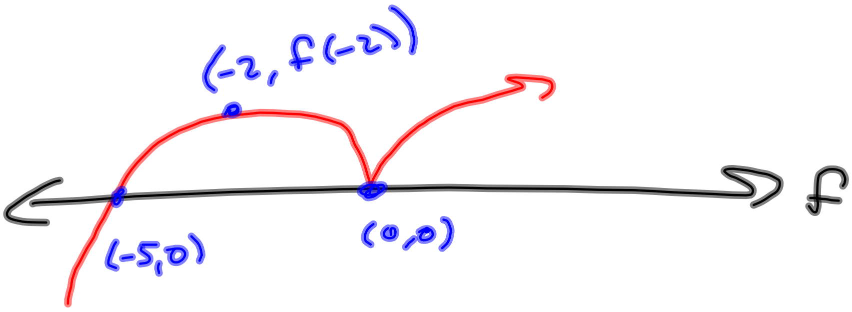
$$f = x^{2/3}(x+5)$$

$$f' = y' = \frac{2}{3}x^{-1/3}(x+5) + x^{2/3}(1)$$

$$= \frac{2x+10}{3x^{1/3}} + \frac{x^{2/3}\,3x^{1/3}}{3x^{1/3}}$$

$$= \frac{2x+10+3x}{3x^{1/3}} = \frac{5x+10}{3x^{1/3}}$$





cnt^{s} on $[0,2]$

difb^{l} .. $(0,2)$

$$\begin{cases} 3 & x=0 \\ -5x^2+3x+a & 0<x<3 \\ mx+b & 3\le x \end{cases}$$

$\lim\limits_{x\to 0^-} f(x) = \lim\limits_{x\to 0^+} f(x) = f(0) = 3$ ✓

$3 = a$

$\lim\limits_{x\to 3^-} f(x) = \lim\limits_{x\to 3^+} f(x) = 3$ cnt^{s}

$-5(3)^2+3(3)+3 = 3m+b$

$-45+9+3$

$-33 = 3m+b.$

d.fb^{l} * $\lim\limits_{h\to 0^-} \dfrac{f(3+h)-f(3)}{h} = \lim\limits_{h\to 0^+} \dfrac{f(3+h)-f(3)}{h}$ *

$(-10x+3)\big|_{x=3} = m$

Show $\exists !$ one zero

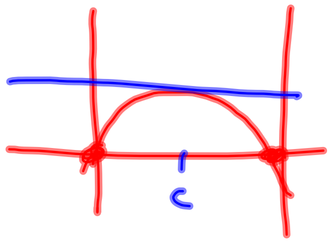
$f(\theta) = 2\theta - \cos^2\theta + \sqrt{2} \quad (-\infty, \infty)$

$f'(\theta) = 2 - 2\cos\theta \sin\theta \overset{SET}{=} 0$

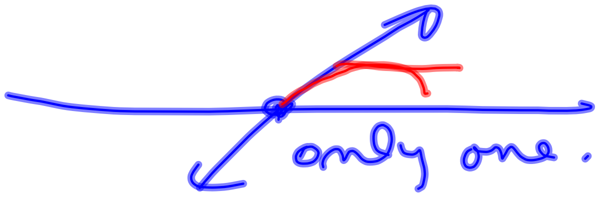
$\Rightarrow \cos\theta \sin\theta = 1$ Nevah!

$(\le 1)(\le 1)$

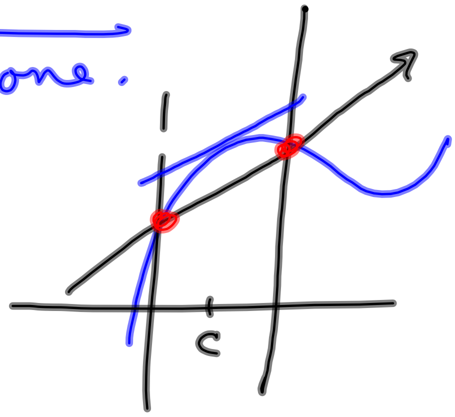
$\cos\theta \sin\theta$



$f'(\theta) > 0 \ \forall x \in \mathbb{R}$



only one.



§4.4

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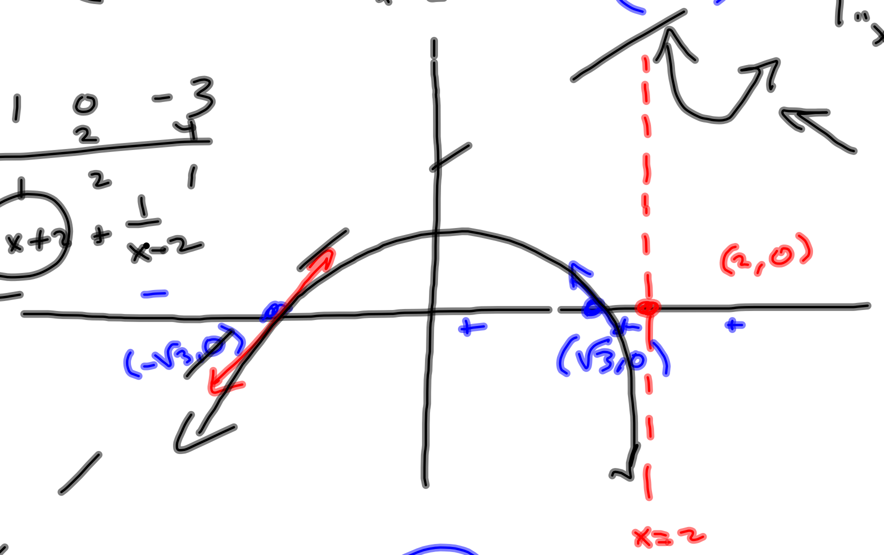
$$y = \frac{x^2-3}{x-2} = \frac{(x-\sqrt{3})(x+\sqrt{3})}{(x-2)} = ($$

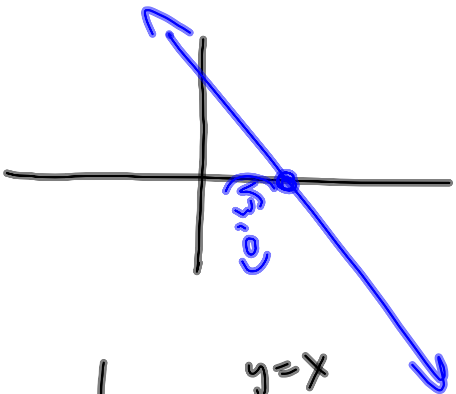
"$x=\sqrt{3}$"

$$\begin{array}{r|rrr} 2 & 1 & 0 & -3 \\ & & 2 & 4 \\ \hline & 1 & 2 & 1 \end{array}$$

$x+2 + \frac{1}{x-2}$



$$\frac{(x-\sqrt{3})(2\sqrt{3})}{(\sqrt{3}-2)} = \frac{2\sqrt{3}}{(\sqrt{3}-2)}(x-\sqrt{3})$$

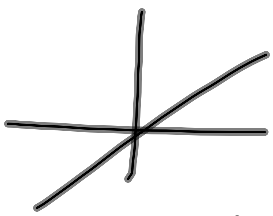


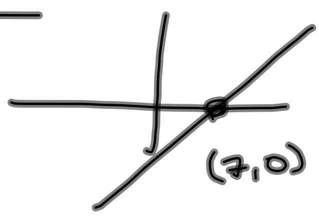
Near $-\sqrt{3}$

$\frac{(x-\sqrt{3})(x+\sqrt{3})}{x-2}$ is like

$\frac{-2\sqrt{3}}{-\sqrt{3}-2}(x+\sqrt{3})$

positive





$$y = \frac{x^2-9}{x-2} = \boxed{\frac{(x-3)(x+3)}{(x-2)}}$$

x-int: $(\pm 3, 0)$

y-int: $(0, \frac{9}{2})$

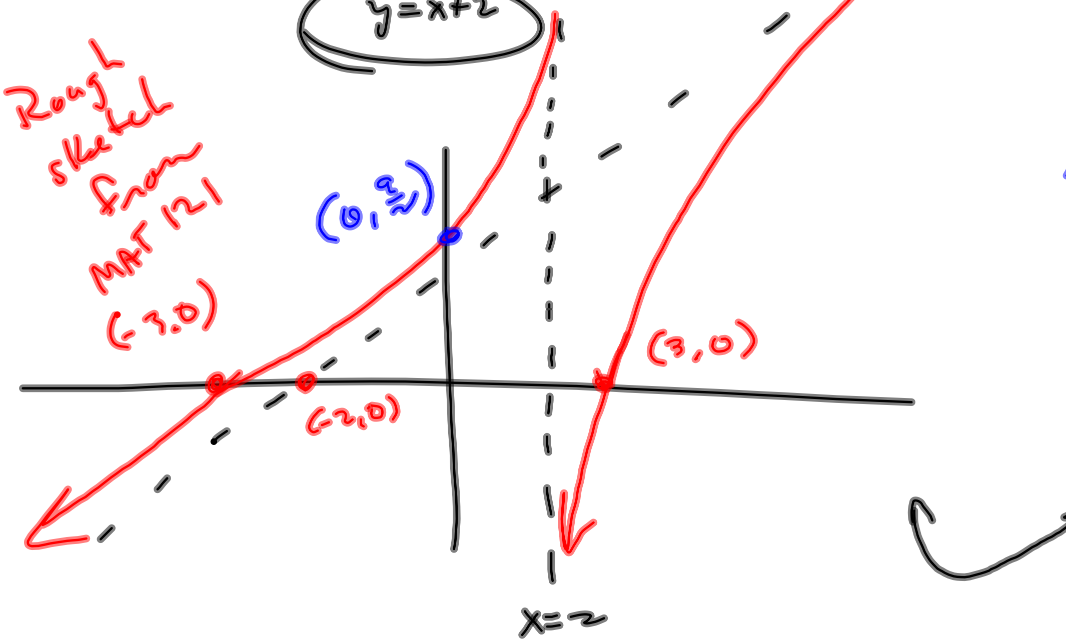
V.A.: $x=2$

H.A.: None

O.A.:

$$\begin{array}{r|rrr} 2 & 1 & 0 & -9 \\ & & 2 & 4 \\ \hline & 1 & 2 & -5 \end{array}$$

$y=x+2$



$$f(x) = \frac{x^2-9}{x-2} = x+2-\frac{5}{x-2} \Rightarrow f'(x) = 1+\frac{5}{(x-2)^2}$$

$$\left(5(x-2)^{-1}\right)' = -5(x-2)^{-2}$$

$$f'(x) = \frac{2x(x-2)-(x^2-9)(1)}{(x-2)^2}$$

$$= \frac{2x^2-4x-x^2+9}{(\ )^2}$$

$$= \frac{x^2-4x+9}{(x-2)^2} \overset{set}{=} 0$$

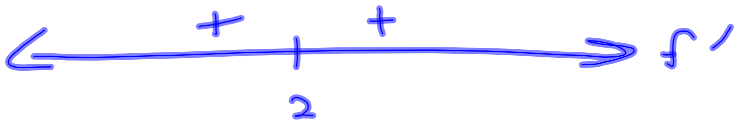
$$x^2-4x = -9$$

$$x^2-4x+2^2 = -5$$

$$\sqrt{(x-2)^2} = \sqrt{-5}$$

$$x-2 = \pm i\sqrt{5}$$

$x=2$ is critical, except for the fact that $x=2 \notin \mathcal{D}(f)$

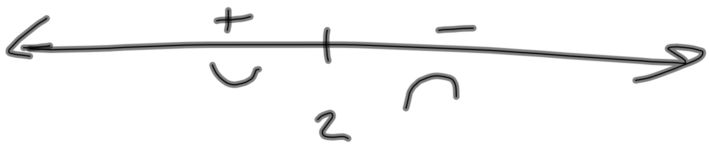


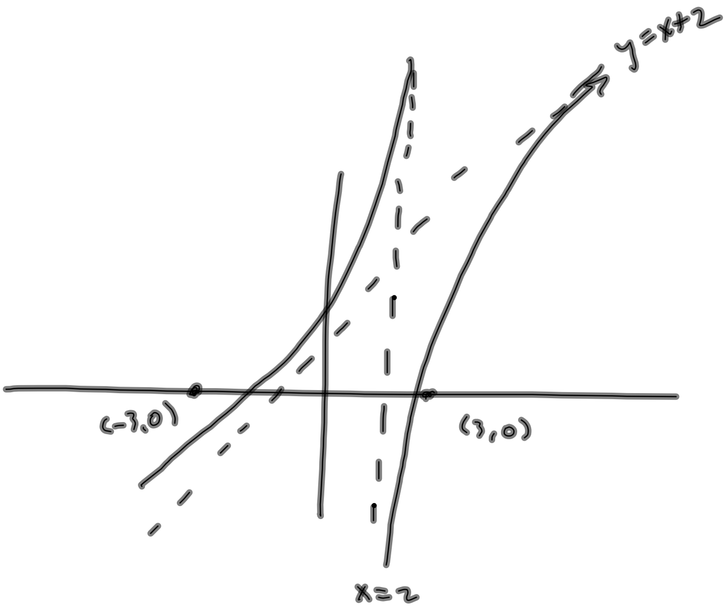
$$\frac{28}{9} = 3+\frac{1}{9}$$

$$y = \frac{x^2-9}{x-2} = x+2-\frac{5}{x-2}$$

$$\Rightarrow y' = 1+\frac{5}{(x-2)^2} = 1+5(x-2)^{-2}$$

$$y'' = -10(x-2)^{-3} = -\frac{10}{(x-2)^3}$$





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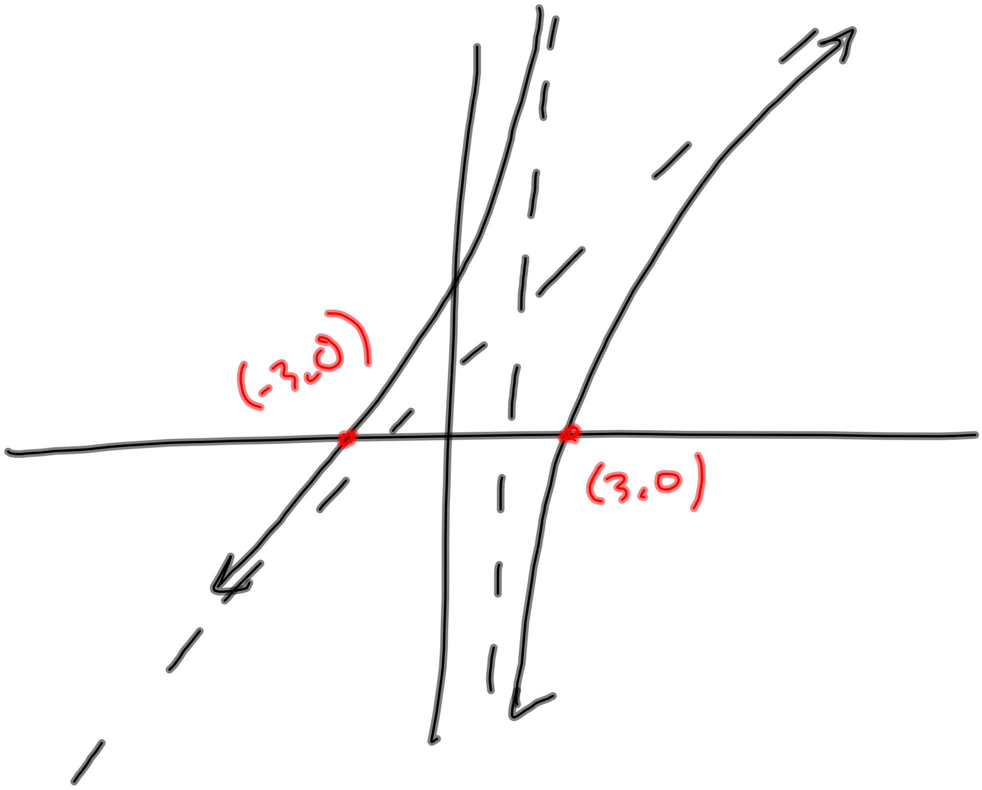

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