

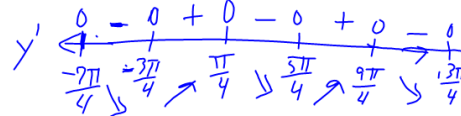
$$\textcircled{7} \quad y = \sin x + \cos x$$

$$\rightarrow y' = \cos x - \sin x$$

$$0 = \cos x - \sin x$$

$$\sin x = \cos x$$

$$x = \frac{\pi}{4} + \pi n$$



incr $(-\frac{3\pi}{4}, \frac{\pi}{4})$, $(\frac{5\pi}{4}, \frac{9\pi}{4})$, etc.

decr $(-\frac{7\pi}{4}, -\frac{3\pi}{4})$, $(\frac{\pi}{4}, \frac{5\pi}{4})$, etc.

$$\textcircled{23} \quad y = \frac{x^2}{x^2 - 4x + 3}, \quad x \neq 3, 1 \quad \text{horiz: } y = 1$$

$$y' = \frac{2x(x^2 - 4x + 3) - x^2(2x - 4)}{(x^2 - 4x + 3)^2} = \frac{-4x^2 + 6x}{(x^2 - 4x + 3)^2} = y'$$

$$0 = -4x^2 + 6x$$

$$0 = 2x(-2x + 3)$$

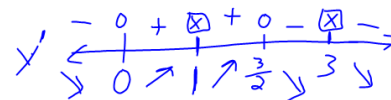
$$2x = 0 \quad -2x + 3 = 0$$

$$x = 0 \quad x = \frac{3}{2}$$

$$0 = x^2 - 4x + 3$$

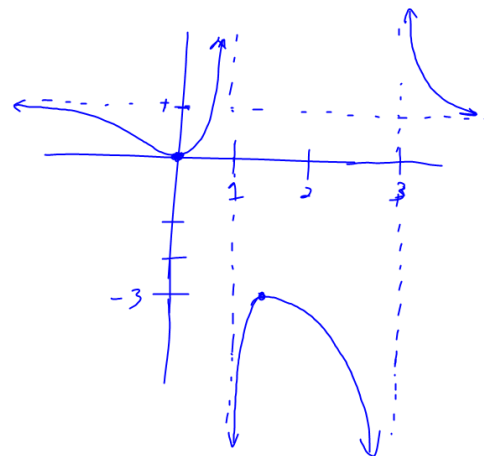
$$0 = (x - 3)(x - 1)$$

$$x = 3, 1$$



$$y = \frac{x^2}{x^2 - 4x + 3}$$

$$(0, 0) \quad (\frac{3}{2}, -3)$$



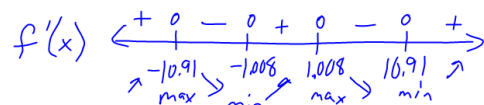
(31)

$$y = x^5 - 200x^3 + 605x - 2$$

$$y' = 5x^4 - 600x^2 + 605$$

$$0 = 5x^4 - 600x^2 + 605$$

$$0 = x^4 - 120x^2 + 121$$

crit #'s $x = -10.91, -1.008, 1.008, 10.91$ 

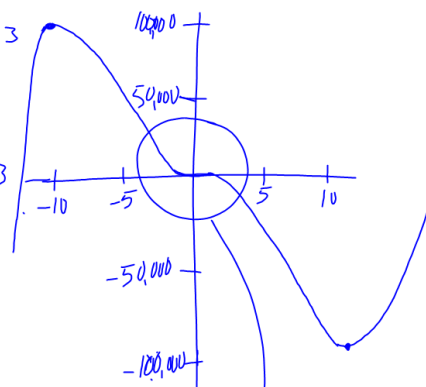
$$f(-10.91) = 98547.3$$

$$f(-1.008) = -408.04$$

$$f(1.008) = 404.04$$

$$f(10.91) = -98551.3$$

$$y\text{-int} = -2$$



(35)

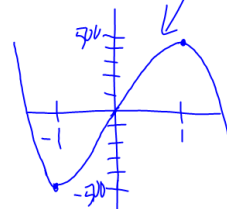
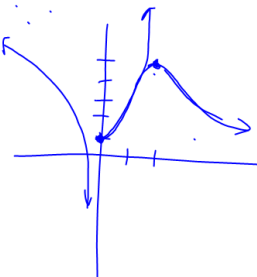
$$f(0) = 1$$

$$f(2) = 5$$

1st der. test

$$\begin{cases} f'(x) < 0 & \text{for } x < 0, x > 2 \\ f'(x) > 0 & 0 < x < 2 \end{cases}$$

decr.
 incr.



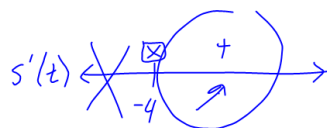
(52)

$$s(t) = \sqrt{t+4} = (t+4)^{1/2}, \quad t \geq -4$$

$$s'(t) = \frac{1}{2}(t+4)^{-1/2} = \frac{1}{2\sqrt{t+4}}$$

$$2\sqrt{t+4} = 0$$

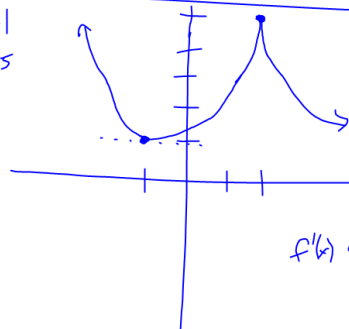
$$t = -4$$

always increasing \rightarrow subs always increasing

(36)

$$f(-1) = 1$$

$$f(2) = 5$$

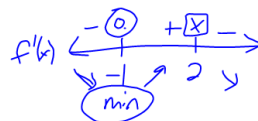


$$f'(x) < 0 \quad x < -1, x > 2$$

$$f'(x) > 0 \quad -1 < x < 2$$

$$f'(-1) = 0$$

$$f'(2) \text{ dne}$$



$$(1) f(x) = 2x^3 + 9x^2 - 24x - 10$$

$$(2) f(x) = x^4 - 6x^2 + 1$$

$$(3) f(x) = x^4$$

$$(4) f(x) = x^4 - 8x^2 + 10$$

$f'(x)$ & crit. #'s

$f''(x)$ & crit #'s