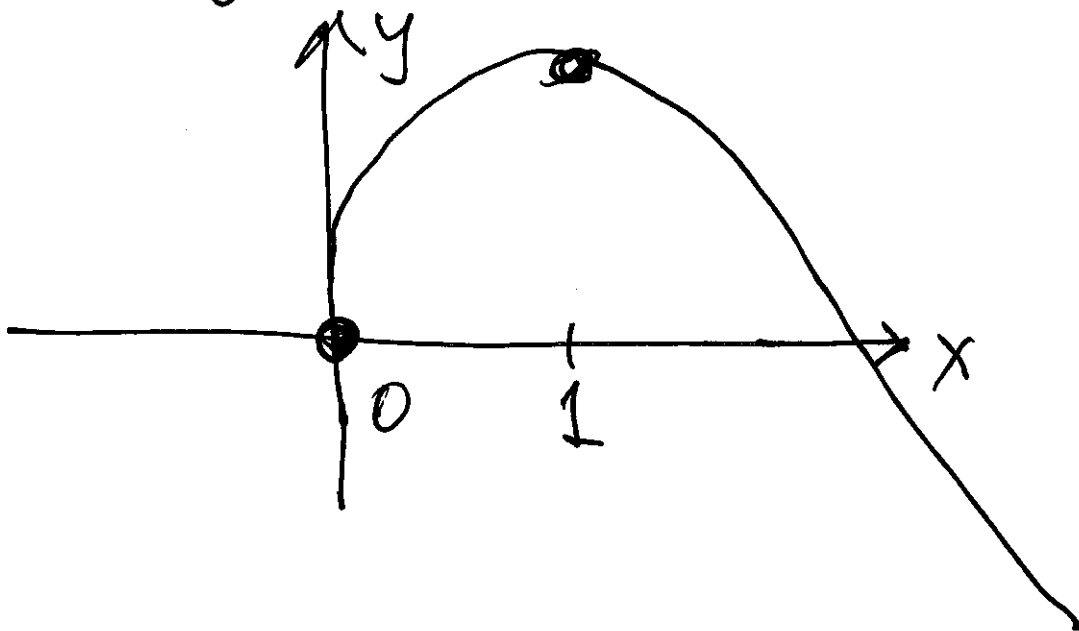
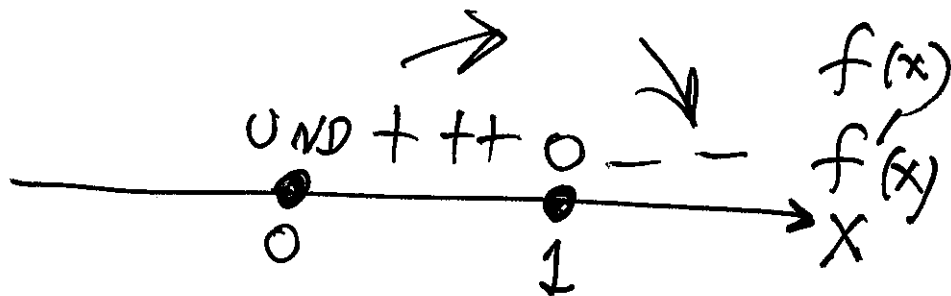


§4.4 - Graphing Fns (Part II)

Last time (c) $y = f(x) = 3\sqrt{x} - x\sqrt{x}$ Domain $x \geq 0$

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

$$f''(x) = \frac{3}{4}x^{-3/2}(-1-x) \checkmark \checkmark$$



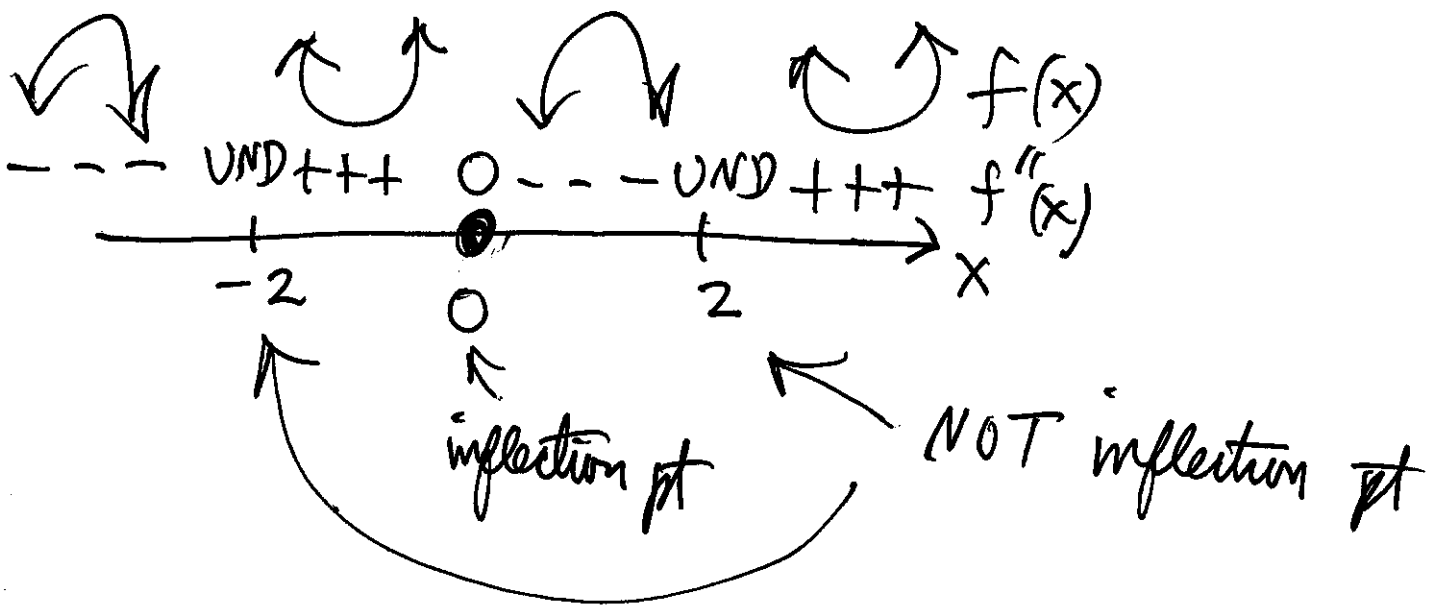
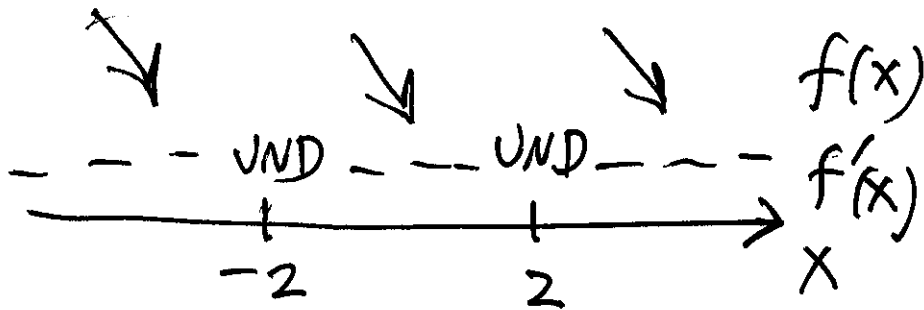
Ex 2 Graph

2

$$a) y = f(x) = \frac{10x}{x^2 - 4}$$

Domain $x \neq \pm 2$

$$\Rightarrow f'(x) = \frac{-10(x^2 + 4)}{(x^2 - 4)^2}; \quad f''(x) = \frac{20x(x^2 + 12)}{(x^2 - 4)^3}$$



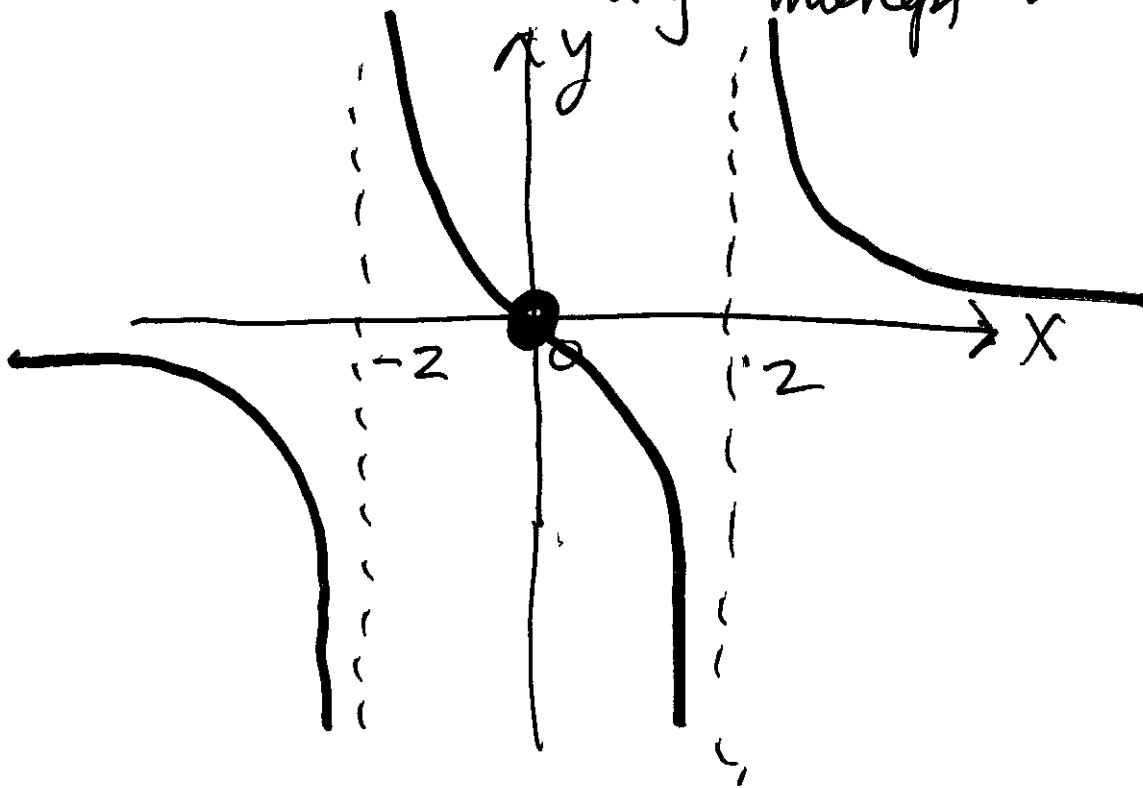
$$y = f(x) = \frac{10x}{x^2 - 4}$$

3

Vertical asymp: $x = \pm 2$

Horizontal asymp: $y = 0$

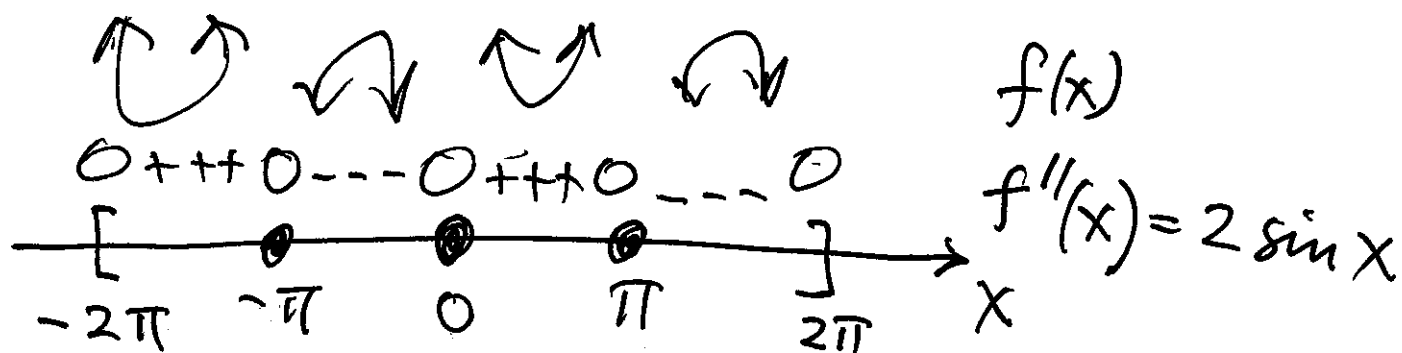
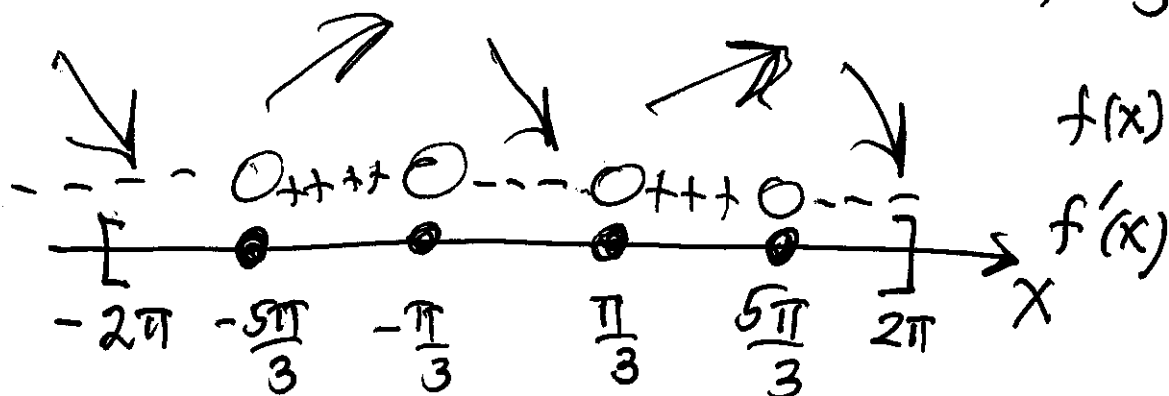
$(0,0)$ is the x and y-intercept ✓

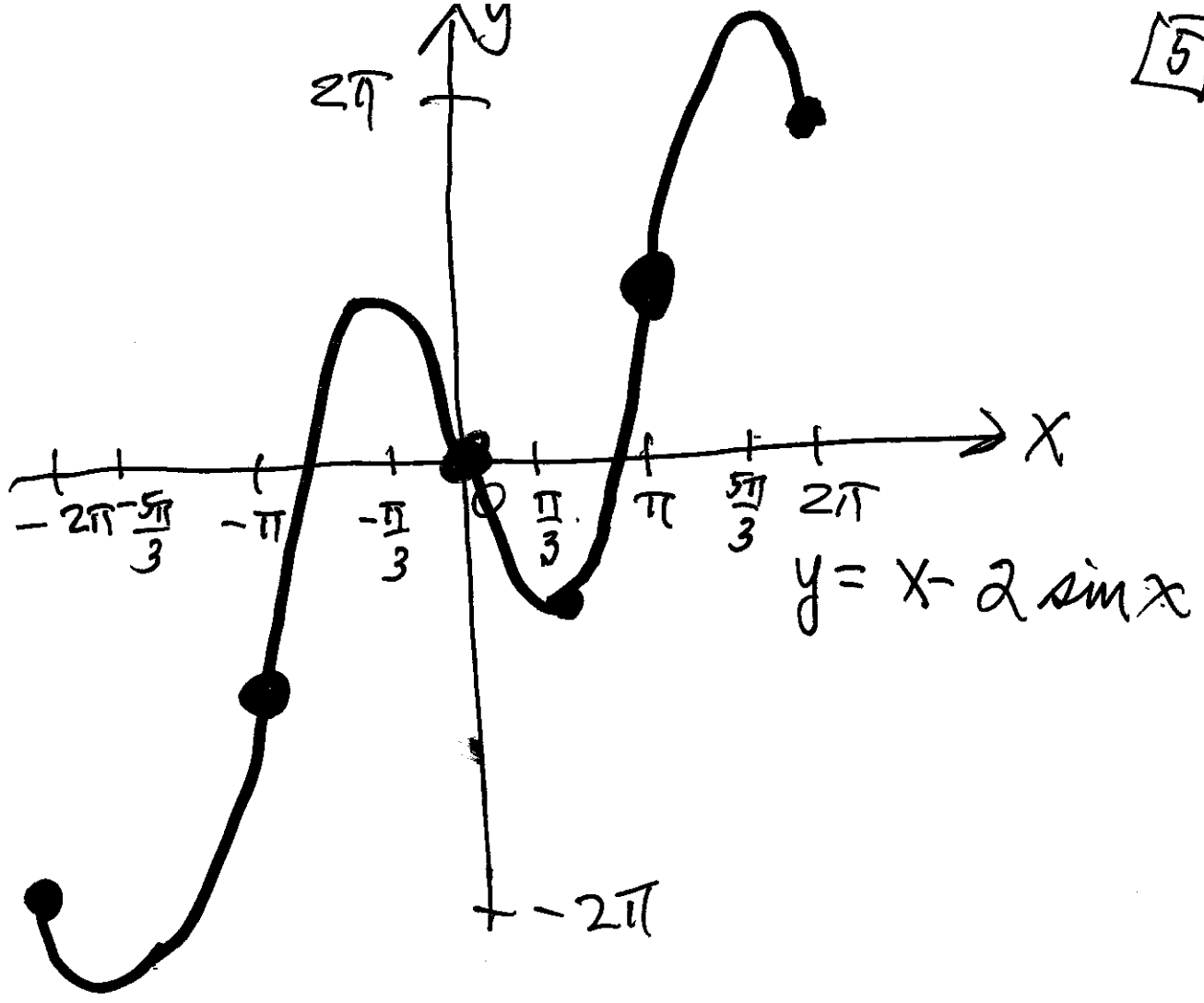


(b) $y = f(x) = x - 2\sin x \quad [-2\pi, 2\pi]$ 4

$f'(x) = 1 - 2\cos x = 0 \Rightarrow x = \frac{\pi}{3}, -\frac{5\pi}{3},$

$f''(x) = 2\sin x \quad -\frac{\pi}{3}, \frac{5\pi}{3}$

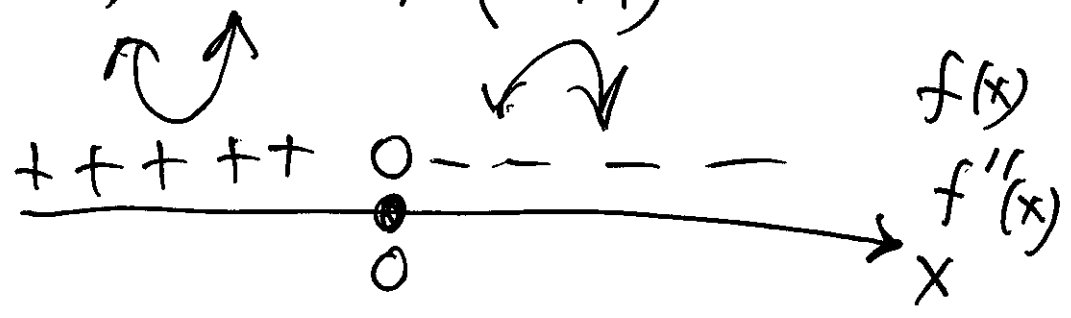




© $y = f(x) = \frac{8x}{\sqrt{x^2+1}}$

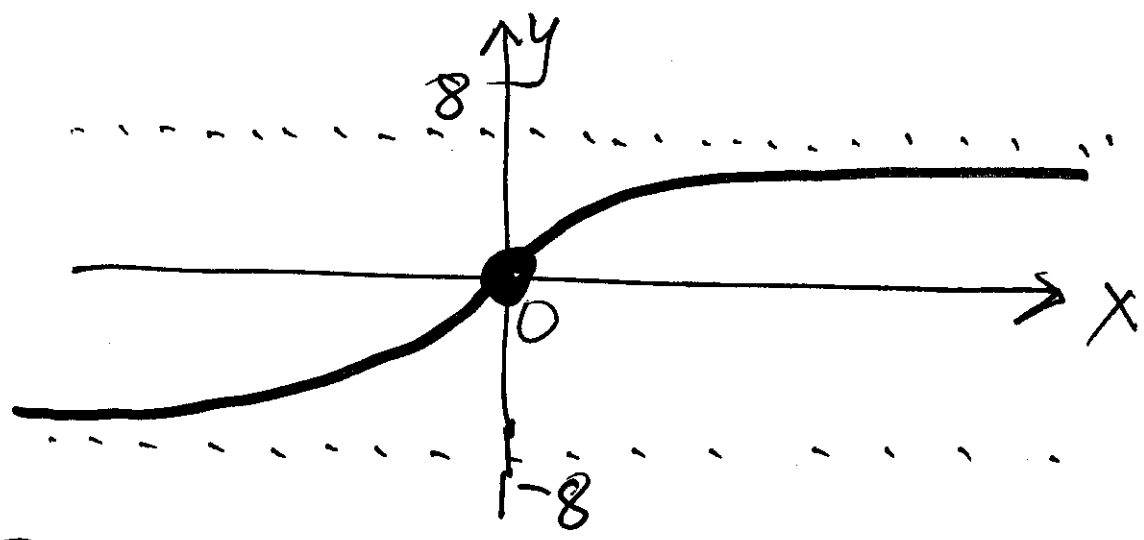
$f'(x) = 8(x^2+1)^{-3/2} > 0$ so $f \nearrow$

$f''(x) = -24x(x^2+1)^{-5/2}$



Horizontal asymp: $\lim_{x \rightarrow \infty} \frac{8x}{\sqrt{x^2+1}} = 8$

\therefore $y=8$ and $y=-8$ and $\lim_{x \rightarrow -\infty} \frac{8x}{\sqrt{x^2+1}} = -8$



d) $y = f(x) = |x^2 + 4x| = \begin{cases} (x^2 + 4x), & \text{if } x^2 + 4x \geq 0 \\ -(x^2 + 4x), & \text{if } x^2 + 4x < 0 \end{cases}$

