

Lesson 24

①

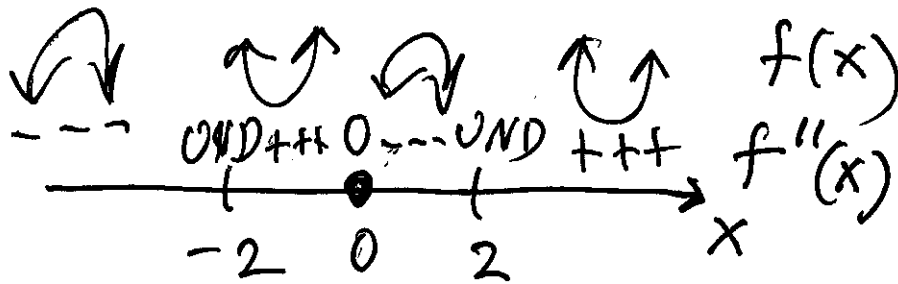
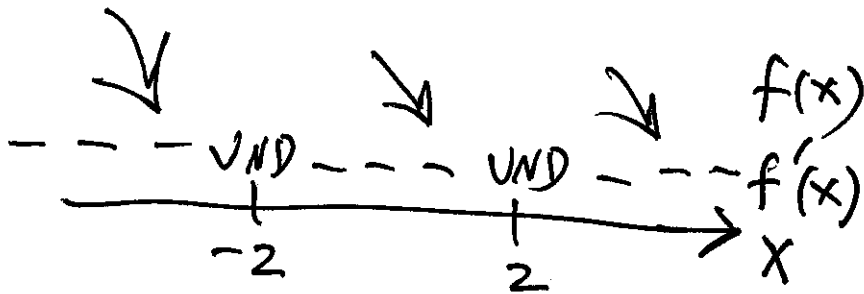
§4.4 - Graphing Functions (Part II)

Ex 2 Sketch graphs

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

Domain $x \neq \pm 2$

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



NOT inflection pts is inflection pt

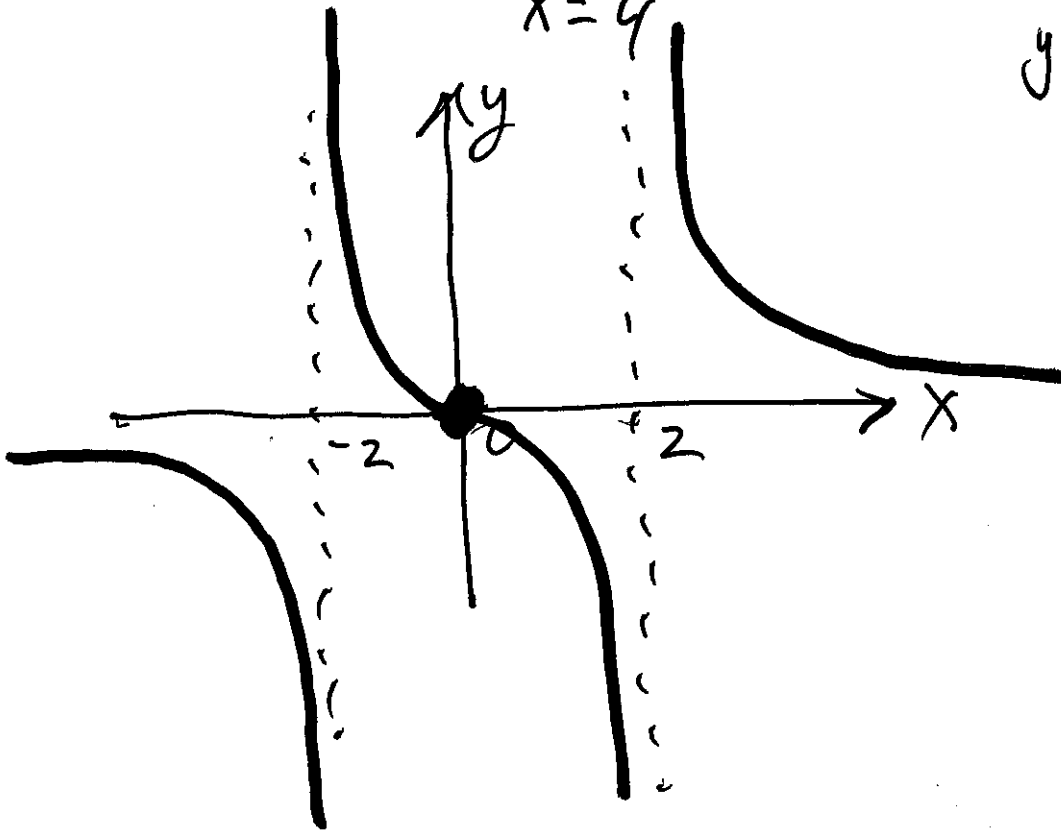
Vertical asymp. at $x = \pm 2$

(2)

Horizontal asymp: at $y = 0$

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

(0,0) x-intercept
y-intercept

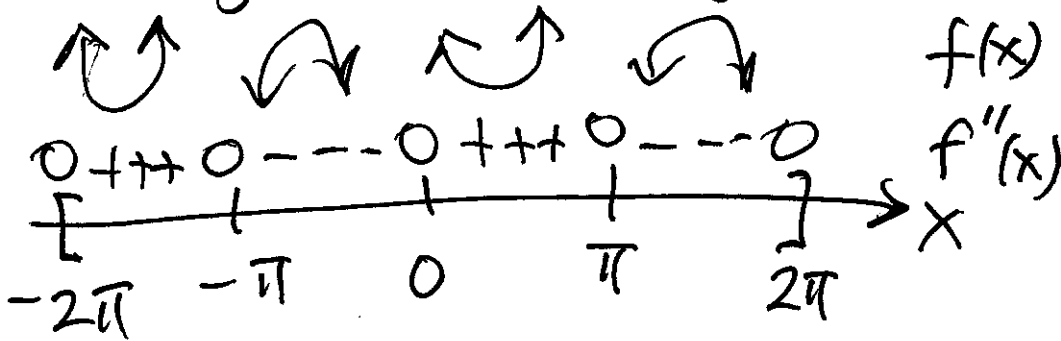
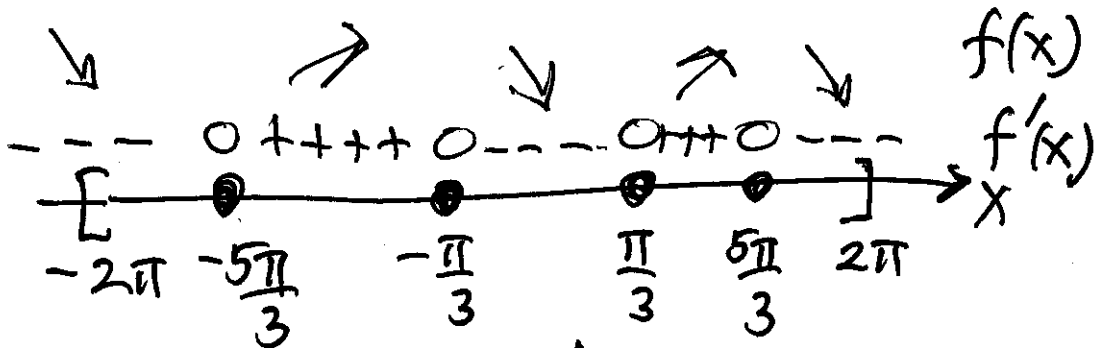


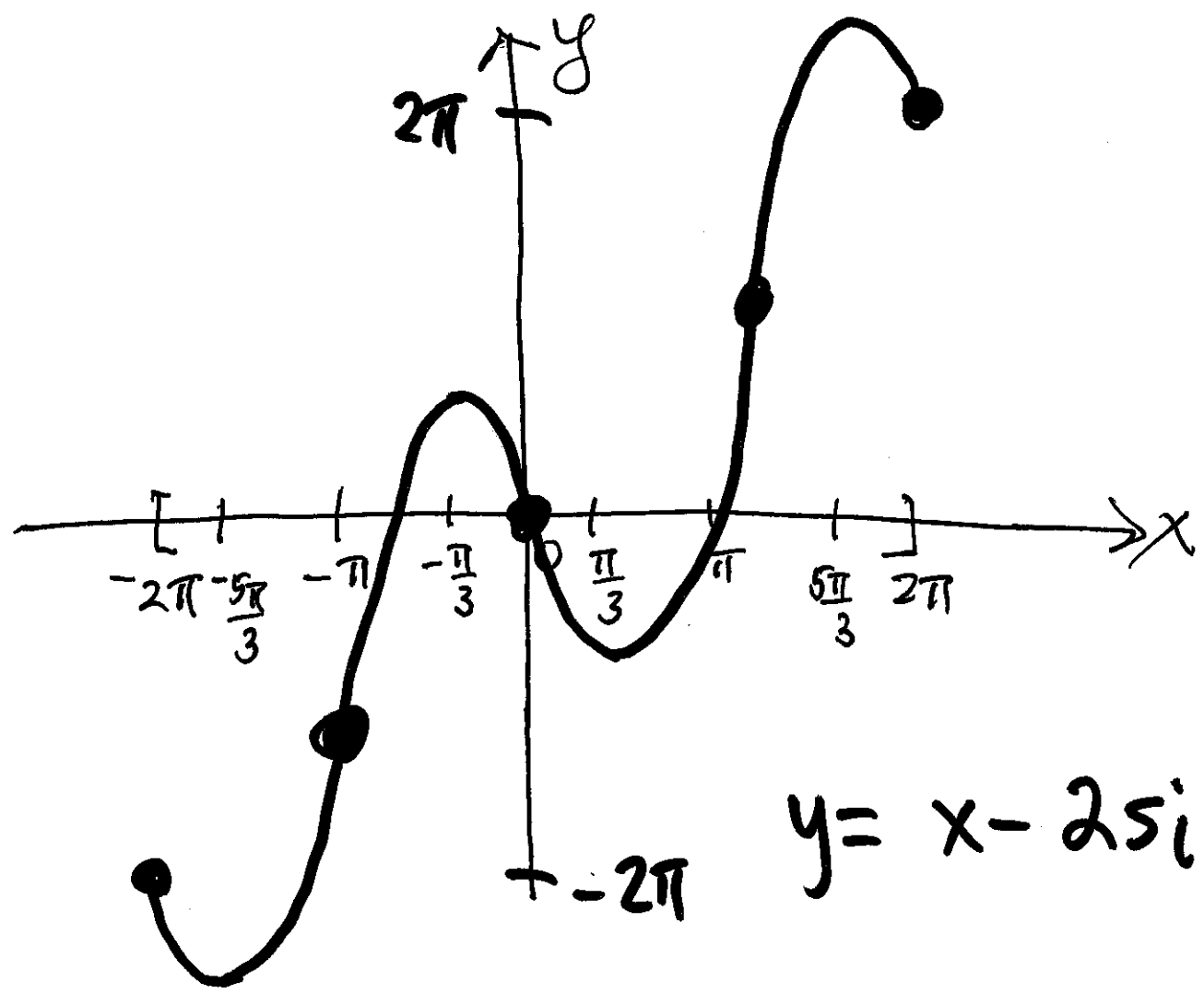
$f(-x) = -f(x) \Rightarrow$ graph symm. w.r.t. origin

(b) $y = f(x) = x - 2\sin x \quad [-2\pi, 2\pi]$ (3)

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

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



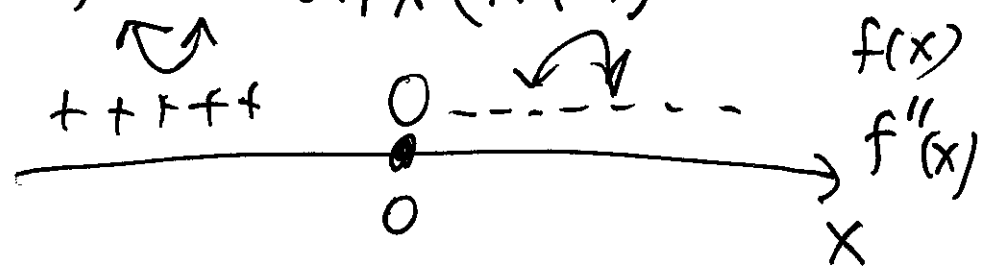


$$y = x - 2\sin x$$

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

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

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



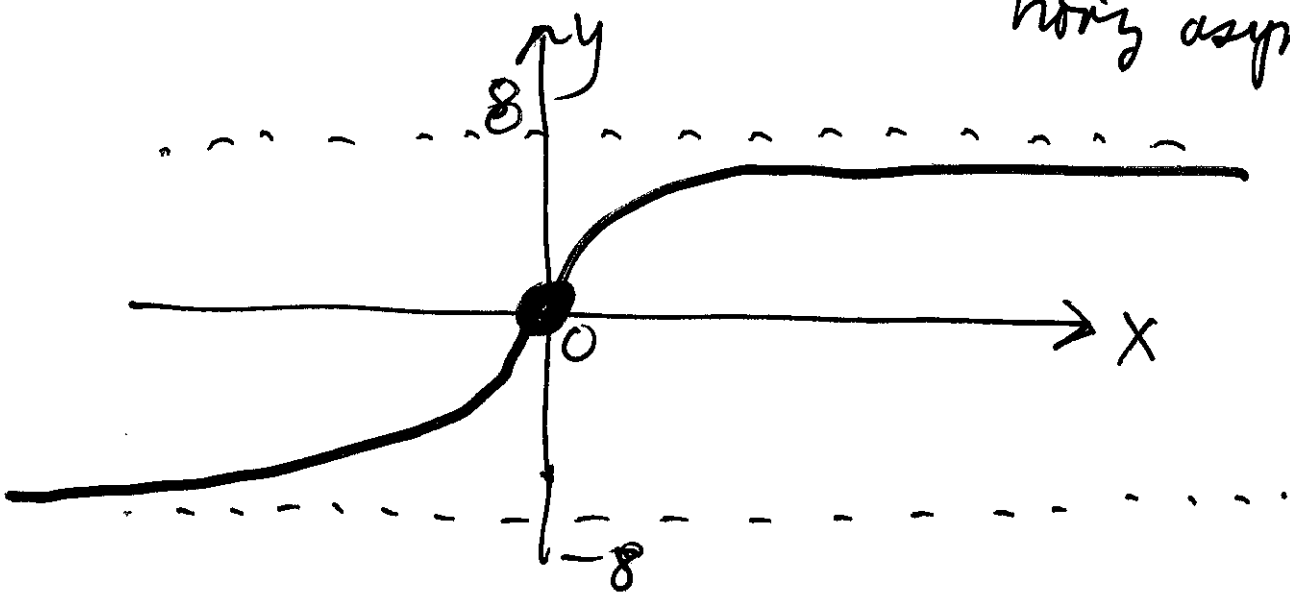
$$\lim_{x \rightarrow \infty} \frac{8x}{\sqrt{x^2+1}} = 8 \Rightarrow y = 8$$

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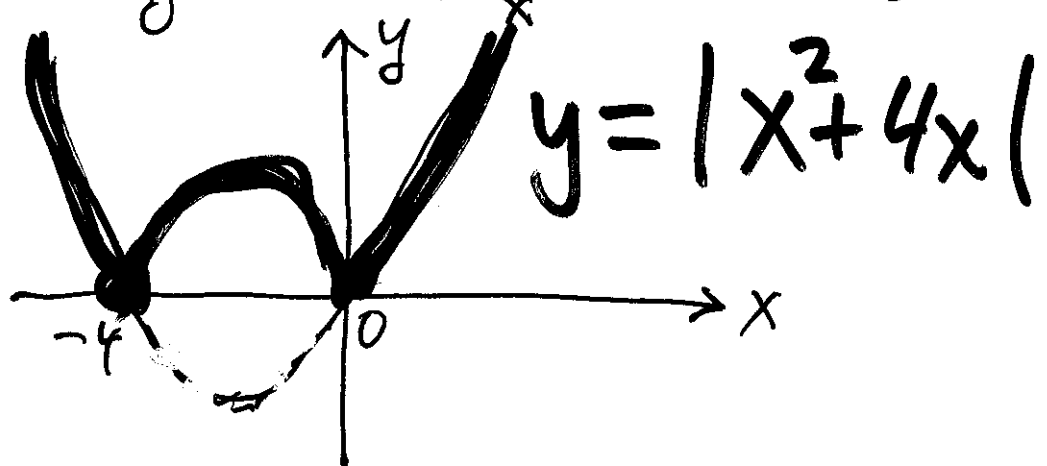
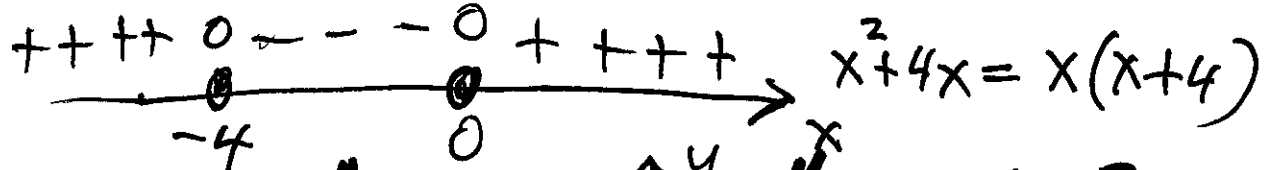
is horiz. asymp.

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

is another horiz asymp!



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



Ex

If $f(0) = 0$ and f', f'' given
as below, sketch $f(x)$

(6)

