2.6 53, 31,

31 $\frac{5}{3} = \frac{25}{15}$ $\frac{5}{3} > \frac{8}{5}$

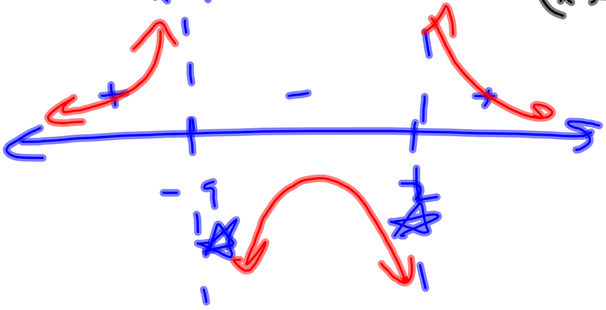
$\frac{8}{5} = \frac{24}{15}$

$$\frac{2x^{5/3} + \text{smaller}}{x^{8/5} + \text{smaller}}$$

$\xrightarrow{x \longrightarrow \infty} \infty$

Grows like $2x^{1/15}$, eventually.

53 $$\frac{1}{x^2+7x-18} = \frac{1}{(x+9)(x-2)}$$



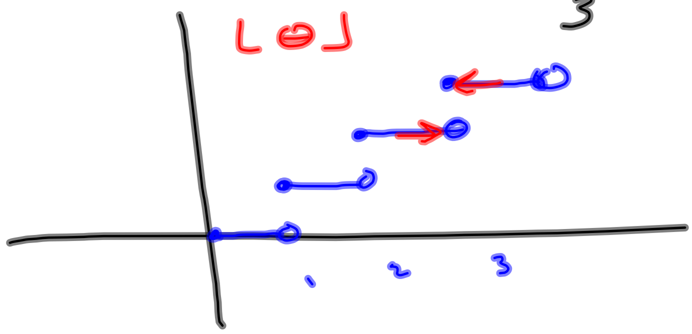
2.4 # 19

$$\lim_{\theta\to3^+} \frac{\lfloor\theta\rfloor}{\theta} = \lim_{\theta\to3^+}\frac{3}{\theta} = \frac{3}{3} = 1$$

$$\lfloor 3.2\rfloor = 3$$

$$\lim_{\theta\to3^-}\frac{\lfloor\theta\rfloor}{\theta} = \lim_{\theta\to3^-}\frac{2}{\theta} \qquad \lfloor 2.9\rfloor = 2$$

$$= \frac{2}{3}$$



$$\frac{|x-7|}{x+2} = \begin{cases} \frac{-(x-7)}{x+2} & x-7<0 \\ \frac{x-7}{x+2} & x-7 \geq 0 \end{cases}$$

$$= \begin{cases} -\frac{(x-7)}{x+2} & x<7 \\ \frac{x-7}{x+2} & x \geq 7 \end{cases}$$

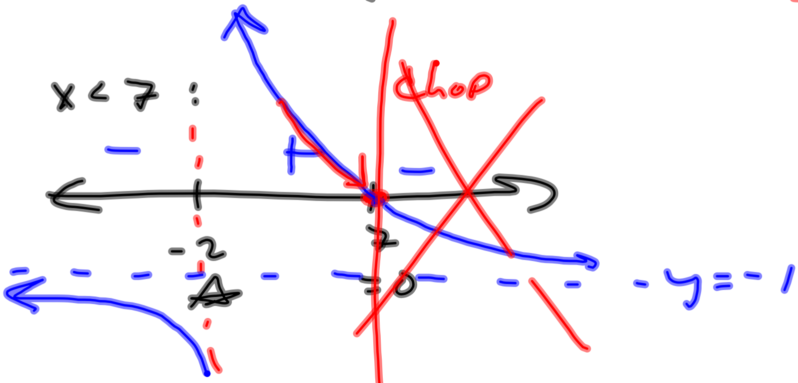
$$-\frac{x}{x} = -1$$

$$\frac{-x+7}{x+2} \xrightarrow{x\to\infty} -1$$

$$\frac{\cancel{x}(-1+\frac{7}{x})}{\cancel{x}(1+\frac{2}{x})} \qquad \frac{7}{x} \to 0 \qquad \frac{2}{x} \to 0$$

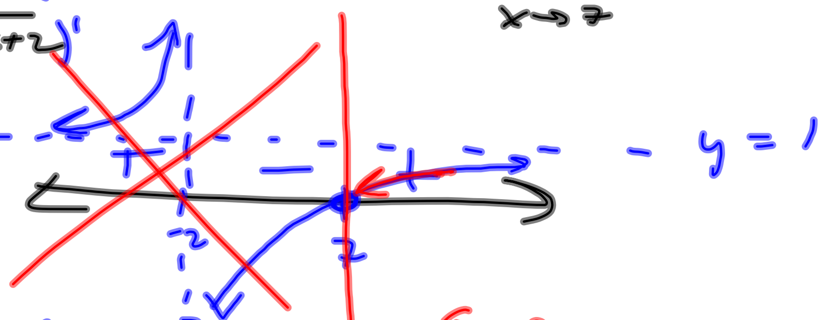
$$\frac{-x}{x} = -1$$

$x<7$:



$$\lim_{x\to 7} f(x) = 0$$

$$\frac{(x-7)'}{(x+2)'}$$



$$\lim_{x\to\infty} \frac{x-7}{x+2} = 1$$

Chop

Find the REAL zeros

$$x^3 - 2 = x^3 - (\sqrt[3]{2})^3$$

$$= (x - \sqrt[3]{2})\boxed{(x^2 + \sqrt[3]{2}\,x + 2^{2/3})}$$

$$(\sqrt[3]{2})^2 = (2^{\frac{1}{3}})^2 = 2^{2/3}$$

$$\boxed{\begin{aligned} x^3 - 2 &= 0 \\ \sqrt[3]{x^3} &= \sqrt[3]{2} \\ x &= \sqrt[3]{2} \end{aligned}}$$

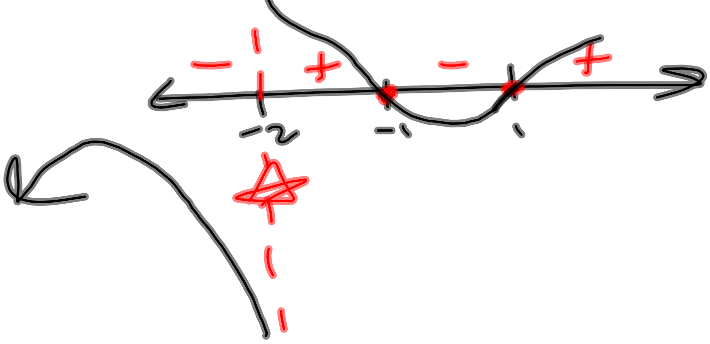
$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

Sep 7-12:34 PM

54 $\frac{x^2-1}{2x+4} = \frac{(x-1)(x+1)}{2(x+2)} = f(x)$

OBLIQUE ASYMPTOTE



a $\lim_{x \to -2^+} f(x) = +\infty$

b $\lim_{x \to -2^-} f(x) = -\infty$

c $f(x) \xrightarrow{x \to 1^+} 0$

d $f(x) \xrightarrow{x \to 0^-} \frac{(0-1)(0+1)}{2(0+2)} = \frac{-1}{4}$

80 $\sqrt{x+9}-\sqrt{x+4} \xrightarrow{x\to\infty} \infty-\infty = ?$

$$= \left(\sqrt{x+9}-\sqrt{x+4}\right)\left(\frac{\sqrt{x+9}+\sqrt{x+4}}{\sqrt{x+9}+\sqrt{x+4}}\right)$$

$$\frac{x+9-(x+4)}{\sqrt{x+9}+\sqrt{x+4}} = \frac{5}{\sqrt{x+9}+\sqrt{x+4}} \xrightarrow{x\to\infty} \frac{5}{\infty}$$

$$\lim_{x\to\infty} \frac{2x}{x} = \lim_{x\to\infty} 2 = 2$$

$$\frac{2\infty}{\infty}$$

Sep 7-12:45 PM

83 $\lim_{x \to -\infty} 2x + \sqrt{4x^2+3x-2}$

$= \sqrt{4x^2} = 2|x|$

Looks like $-2\infty + 2\infty = 0$?

$$\left(2x+\sqrt{4x^2+3x-2}\right)\left(\frac{2x-\sqrt{4x^2+3x-2}}{2x-\sqrt{4x^2+3x-2}}\right)$$

$$= \frac{4x^2-(4x^2+3x-2)}{2x-\sqrt{4x^2+3x-2}} = \frac{-3x+2}{2x-\sqrt{4x^2+3x-2}}$$

$$= \frac{-3x+2}{2x+2x\sqrt{1+\frac{3}{4x}-\frac{1}{2x^2}}}$$

$|2x| = -2x$ when $x \longrightarrow -\text{BIG}$

$$\frac{x\left(-3+\frac{2}{x}\right)}{x\left(2+2\sqrt{1+\frac{3}{4x}-\frac{1}{2x^2}}\right)} \xrightarrow{x \to -\infty} -\frac{3}{4}$$

So $\left|\sqrt{4x^2+3x-1}\right|$ is $\frac{3}{4}$ units SMALLER than $|2x|$ as $x \to -\infty$

I couldn't say this correctly, today.