

$$\underline{43} \quad \lim_{x \rightarrow b} \frac{(x-b)^{50} - x + b}{x-b} = \frac{0}{0}$$

$$\lim_{x \rightarrow b} \frac{(x-b)^{\cancel{49}} - \cancel{(x-b)}}{\cancel{x-b}}$$

$$\lim_{x \rightarrow b} \frac{(x-b)^{49} - 1}{1} = \frac{0-1}{1} = -1$$

$$\underline{45} \quad \lim_{x \rightarrow -1} \frac{(2x-1)^2 - 9}{x+1} = \frac{(-3)^2 - 9}{-1+1} = \frac{0}{0}$$

$$\lim_{x \rightarrow -1} \frac{(2x-1+3)(2x-1-3)}{x+1}$$

$$x^2 - 4 \\ (x+2)(x-2)$$

$$\lim_{x \rightarrow -1} \frac{\cancel{2(x+1)}(2x-4)}{\cancel{x+1}}$$

$$= 2(-2-4)$$

$$= -12$$

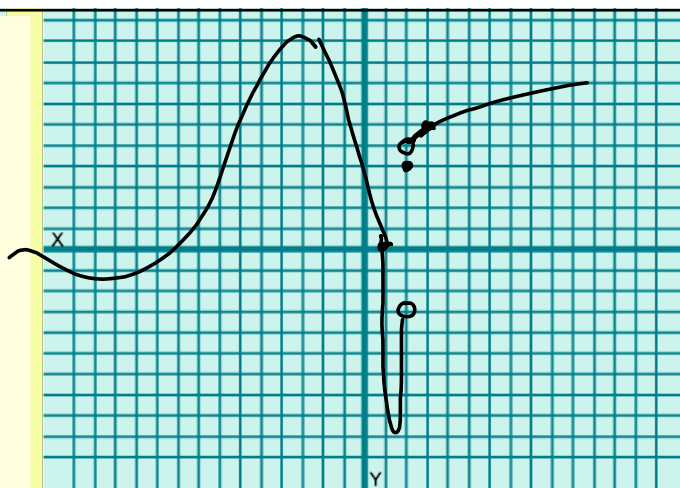
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$$f(1) = 0 \quad f(3) = 6$$

$$f(2) = 4$$

$$\lim_{x \rightarrow 2^-} f(x) = -3$$

$$\lim_{x \rightarrow 2^+} f(x) = 5$$

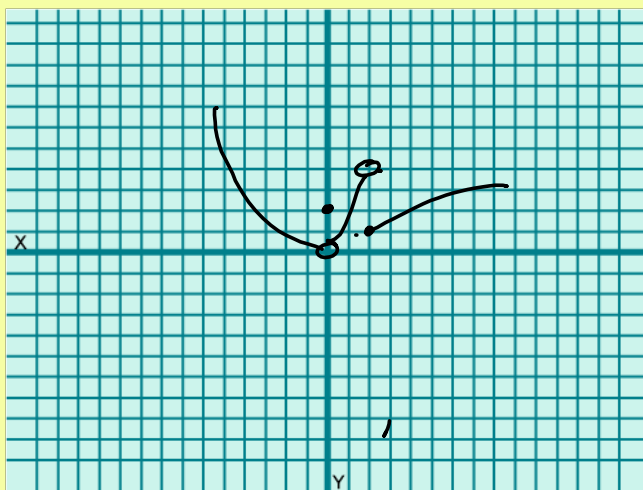
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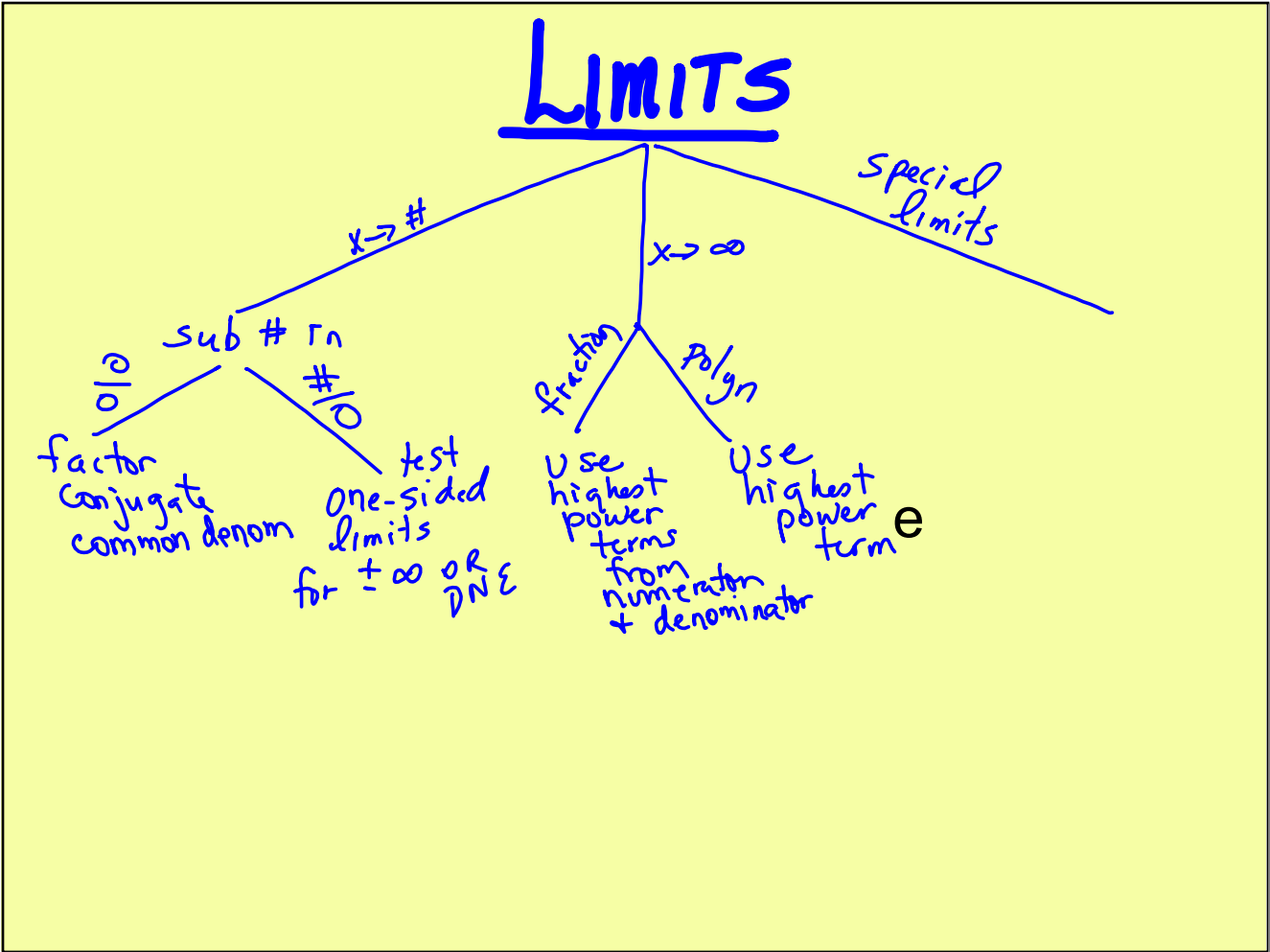
$$p(0) = 2$$

$$\lim_{x \rightarrow 0} p(x) = 0$$

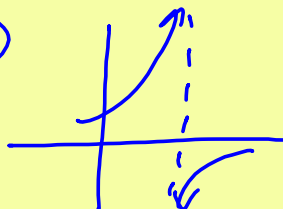
$$\lim_{x \rightarrow 2} p(x) = \text{DNE}$$

$$p(2) = \lim_{x \rightarrow 2^+} p(x) = 1$$





$$\lim_{x \rightarrow 4} \frac{3x}{x^2 - 16} = \frac{12}{0} = \text{DNE}$$



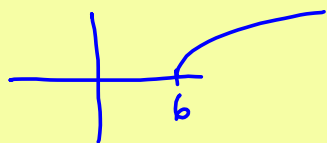
$$\lim_{x \rightarrow 4^-} \frac{3x}{x^2 - 16} = \frac{+}{-} = -\infty$$

$$\lim_{x \rightarrow 4^+} \frac{3x}{x^2 - 16} = \frac{+}{+} = +\infty$$

$$\lim_{x \rightarrow -7^+} \frac{3x - 11}{x + 7} = \frac{-32}{0} = \frac{-}{+} = -\infty$$

$$\lim_{x \rightarrow 2^-} \frac{5 - x}{x^2 + 2x} = \frac{3}{8}$$

$$\lim_{x \rightarrow 6^-} \sqrt{x-6} = \sqrt{0} = 0 \text{ DNE}$$



$$f(x) = \begin{cases} x^2 - 3 & x < 2 \\ 4x + 7 & x = 2 \\ \frac{2}{x-2} & x > 2 \end{cases}$$

$$\lim_{x \rightarrow 2} f(x) = \text{DNE}$$

$$\lim_{x \rightarrow 2^-} x^2 - 3 = 1$$

$$\lim_{x \rightarrow 2^+} \frac{2}{x-2} = \frac{2}{0} = \frac{+}{+} = +\infty$$

LIMITS TO $\pm\infty$

$$\lim_{x \rightarrow \infty} \frac{\frac{1}{x^2} x^2}{\frac{1}{x^2} 7x^2 + 3} = \frac{\infty^2}{7 \cdot \infty^2 + 3} = \frac{\infty}{\infty}$$

indeterminate

$$\frac{1}{-10} \quad \frac{1}{-100} \quad \frac{1}{7000} \quad \frac{1}{-10000000}$$

$$0.1 \quad 0.01 \quad 0.001 \quad 0.0001$$

$$\lim_{x \rightarrow \infty} \frac{1}{7 + \frac{3}{x^2}} = \frac{1}{7 + \frac{3}{\infty}} = \frac{1}{7}$$

$$\frac{1}{\infty} = 0$$

$$\lim_{x \rightarrow -\infty} \frac{4x^3 - 3x^2 + 1}{5x^4 + 2x^2 - 9}$$

$$\lim_{x \rightarrow -\infty} \frac{4x^3}{5x^4} = \lim_{x \rightarrow -\infty} \frac{4}{5x} = \frac{4}{-\infty} = 0$$

$$\lim_{y \rightarrow -\infty} \frac{5y^3 + 4}{3y + 7} = \lim_{y \rightarrow -\infty} \frac{5y^{\cancel{3}2}}{3y} = \lim_{y \rightarrow -\infty} \frac{5y^2}{3} = \frac{5}{3}(-\infty)^2 = +\infty$$

$$\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 + 3}}{6x + 5} = \lim_{x \rightarrow -\infty} \frac{\sqrt{x^2}}{6x} = \lim_{x \rightarrow -\infty} \frac{|x|}{6x}$$

$$= \lim_{x \rightarrow -\infty} \frac{-x}{6x} = -\frac{1}{6}$$

Even-Even-Odd
index inside outside

$$\sqrt[n]{a^4 b^6 c^5} = a^{2} |b^3| c^2 \sqrt[n]{c^1}$$

$$\lim_{z \rightarrow -\infty} (-3z^2 - 7z) = -3(-\infty)^2 = -3 \cdot +\infty = -\infty$$