LIMITS

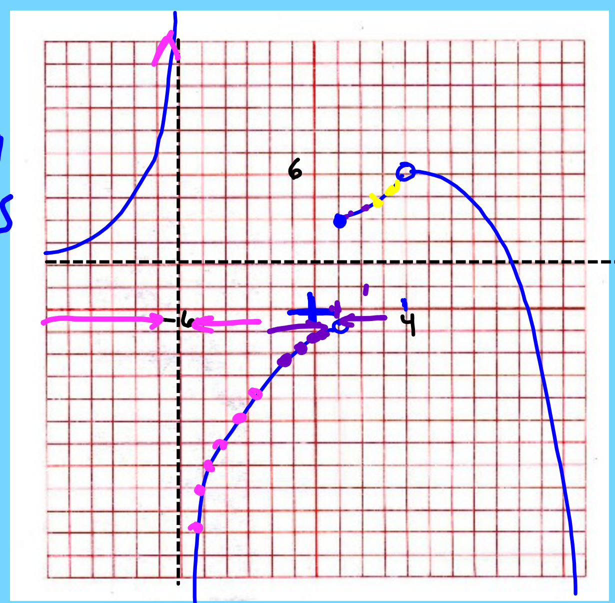
– find what the y-coord. is approaching as x approaches a give number

$\lim_{x \to -6^-} f(x) = +\infty$

$\lim_{x \to -6^+} f(x) = -\infty$

$\lim_{x \to -6} f(x) = \text{DNE}$ (Does not exist)

$f(-6) = \text{undefined}$



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

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

$\lim_{x \to 1^-} f(x) = -1$

$\lim_{x \to 1^+} f(x) = 4$

$\lim_{x \to 1} f(x) = \text{DNE}$

$f(1) = 4$

$\lim_{x \to 4^-} f(x) = 6$

$\lim_{x \to 4^+} f(x) = 6$

$\lim_{x \to 4} f(x) = 6$

$f(4) = \text{undef.}$

Domain: $[-5, \infty)$

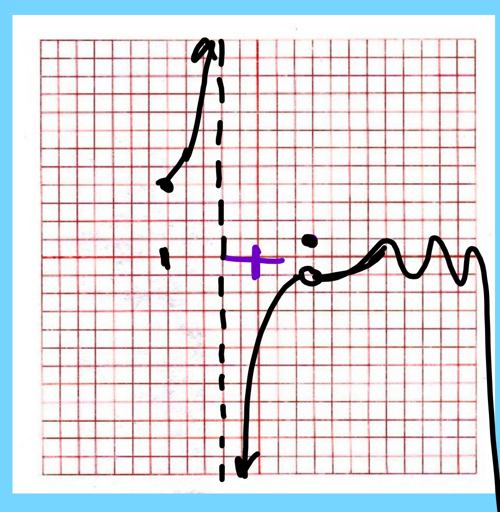
$f(-2) = \text{undef.}$ ← hole or asymp.

$f(3) = 1$ $(3, 1)$

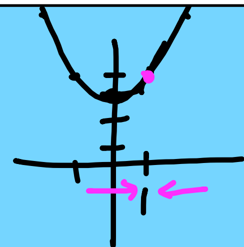
$\lim_{x \to -2^-} f(x) = +\infty$

$\lim_{x \to -2} f(x) = \text{DNE}$ ← Not going $+\infty$

$\lim_{x \to 3} f(x) = -1$



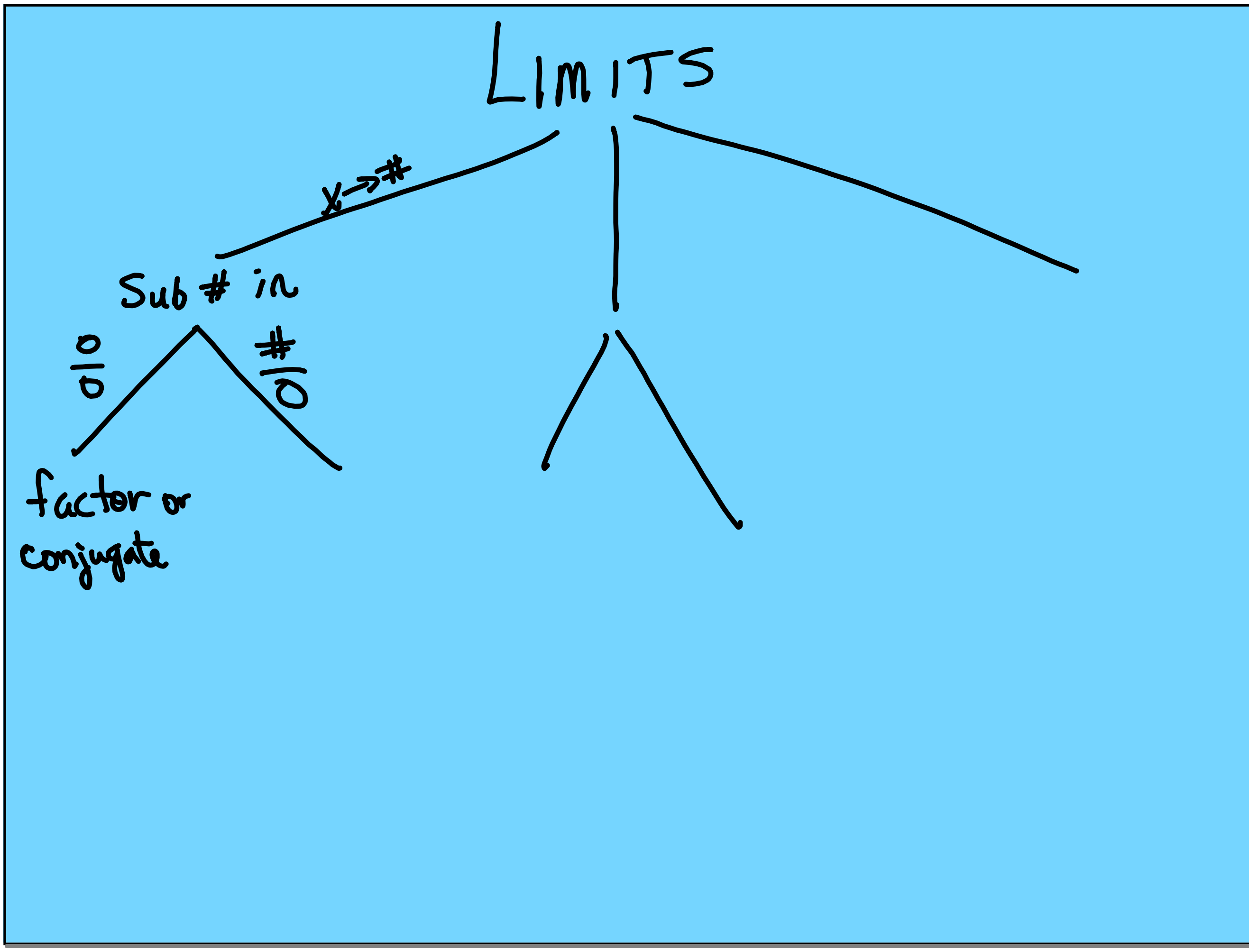
$$\lim_{x \to 1} x^2+3 = 4$$



$$\lim_{x \to 2} \frac{3x^2-4x-4}{x-2} = \frac{12-8-4}{2-2} = \frac{0}{0}$$ indeterminate

$$\lim_{x \to 2} \frac{(3x+2)\cancel{(x-2)}}{\cancel{x-2}} = 3(2)+2 = \boxed{8}$$

August 29, 2025



$$\lim_{x\to 3} \frac{x^2-4x+3}{x^3-27} = \frac{9-12+3}{27-27} = \frac{0}{0}$$

$$\lim_{x\to 3} \frac{(x-1)\cancel{(x-3)}}{\cancel{(x-3)}(x^2+3x+9)} = \frac{3-1}{3^2+3(3)+9} = \boxed{\frac{2}{27}}$$

sq sq

$$\lim_{h\to 0} \frac{\sqrt{9+h}-3}{h} = \frac{3-3}{0} = \frac{0}{0}$$

$$\frac{\quad}{2+\sqrt{3}} \frac{(2-\sqrt{3})}{(2-\sqrt{3})}$$

$$\frac{\quad}{4-3}$$

$$\frac{\quad}{1}$$

$$\lim_{h\to 0} \frac{(\sqrt{9+h}-3)}{h} \frac{(\sqrt{9+h}+3)}{(\sqrt{9+h}+3)}$$

$$\lim_{h\to 0} \frac{\cancel{9}+\cancel{h}-\cancel{9}}{\cancel{h}(\sqrt{9+h}+3)} = \frac{1}{\sqrt{9+0}+3} = \frac{1}{6}$$

August 29, 2025