

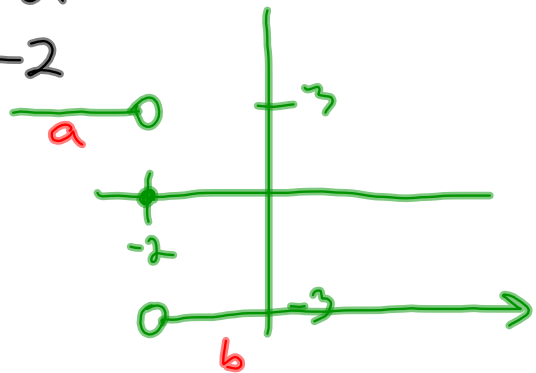
$$1) \lim_{x \rightarrow 2} 3x^2 - 6 = 3(2)^2 - 6 = 6$$

$$2) \lim_{x \rightarrow \infty} \frac{3x^2 - 1}{5x^2 + x - 6} = \frac{3}{5}$$

$$\frac{\frac{3x^2}{x^2} - \frac{1}{x^2}}{\frac{5x^2}{x} + \frac{x}{x^2} - \frac{6}{x^2}} = \frac{3 - \frac{1}{x^2}}{5 + \frac{1}{x} - \frac{6}{x^2}}$$

The diagram shows the limit process for the second problem. The numerator is  $3 - \frac{1}{x^2}$  and the denominator is  $5 + \frac{1}{x} - \frac{6}{x^2}$ . As  $x \rightarrow \infty$ , the terms  $\frac{1}{x^2}$ ,  $\frac{1}{x}$ , and  $\frac{6}{x^2}$  all approach 0. Arrows labeled '0' point to these terms. The terms 3 and 5 are circled, and the final result is  $\frac{3}{5}$ .

$$3) \quad f(x) = \begin{cases} 3 & x < -2 \\ 0 & x = -2 \\ -3 & x > -2 \end{cases}$$



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

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

c) d.n.e.  $a, b$  are not =

$$4) f(x) = x^2 + 2x + 6$$

$$f(x+h) = (x+h)^2 + 2(x+h) + 6$$

$$= x^2 + 2xh + h^2 + 2x + 2h + 6$$
$$- f(x) \quad - x^2 - 2x - 6$$

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$$2xh + h^2 + 2h$$

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{h(2x+h+2)}{h} = 2x+2$$