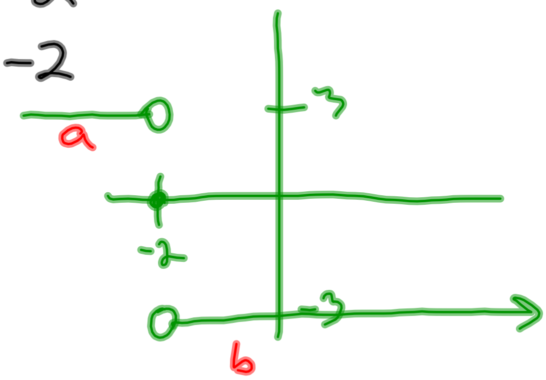
1) $\lim\limits_{x\to 2} 3x^2-6 = 3(2)^2-6 = 6$

2) $\lim\limits_{x\to\infty} \dfrac{3x^2-1}{5x^2+x-6} = \dfrac{3}{5}$

$$\frac{\frac{3x^2}{x^2}-\frac{1}{x^2}}{\frac{5x^2}{x}+\frac{x}{x^2}-\frac{6}{x^2}} = \frac{3-\overset{\to 0}{\cancel{\frac{1}{x^2}}}}{5+\overset{\to 0}{\cancel{\frac{1}{x}}}-\overset{\to 0}{\cancel{\frac{6}{x^2}}}}$$

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



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

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

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

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

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

$$= x^2 + 2xh + h^2 + 2x + 2h + 6$$

$$-f(x) \qquad -x^2 - 2x - 6$$

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

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