LIMITS

1. Evaluate the following limits if they exist.

(a) $\lim\limits_{x \to 0} \dfrac{\dfrac{2}{x+2} - 1}{x}$

(b) $\lim\limits_{x \to \infty} \dfrac{(2 - 3x^2)^2}{6x^4 - 7x^2 - 5}$

(c) $\lim\limits_{x \to 1} \dfrac{(x+2)^3 - 27}{x - 1}$

(d) $\lim\limits_{x \to 7} \dfrac{\sqrt{x+9} - 4}{x - 7}$

(e) $\lim\limits_{x \to \infty} \dfrac{4x + 7}{3x^2 - 2}$

(f) $\lim\limits_{x \to 4} \dfrac{x^2 - 10x + 24}{x^2 - 16}$

(g) $\lim\limits_{h \to 0} \dfrac{(h-2)^2 - 4}{h}$

(h) $\lim\limits_{x \to -2} 5x^2 - 3x + 6$

2. Given the function ... $f(x) = \begin{cases} 3-x & \text{if } x < -1 \\ 4 & \text{if } -1 \le x < 2 \\ 6 & \text{if } x = 2 \\ (x-2)^2 + 4 & \text{if } x > 2 \end{cases}$

Using the three conditions for continuity examine $f(x)$ for any points of discontinuity. Draw a sketch of $f(x)$ and list any point(s) of discontinuity
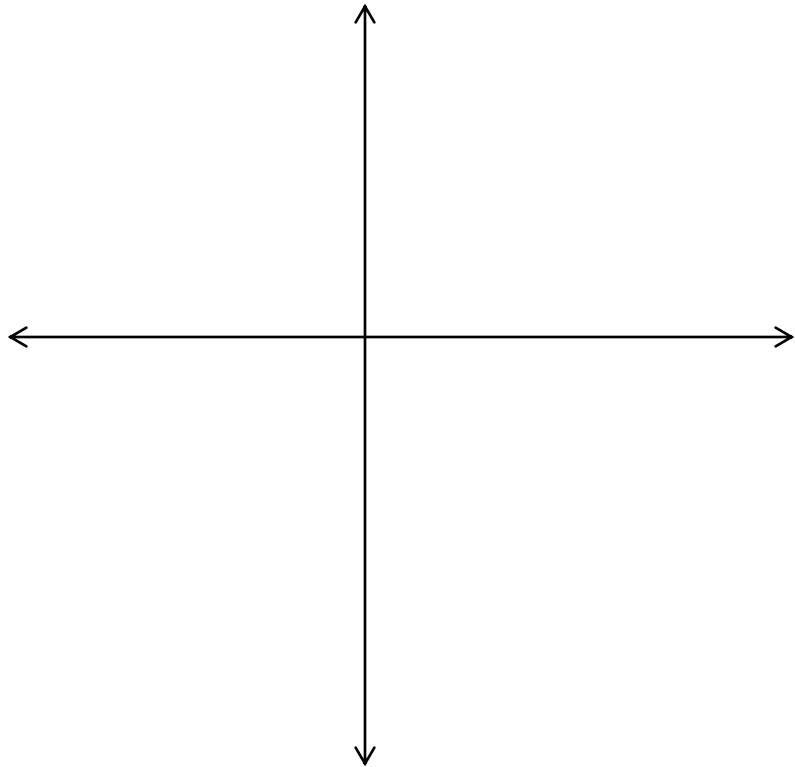
3. The following is a graph of $f(x)$:

Evaluate each of the following:

(a) $\lim\limits_{x \to -3^+} f(x) = $____   (b) $\lim\limits_{x \to -3^-} f(x) = $____

(c) $f(-3) = $____   (d) $\lim\limits_{x \to 2^-} f(x) = $____

(e) $\lim\limits_{x \to 2^+} f(x) = $____   (f) $f(2) = $____

(g) $\lim\limits_{x \to 3} f(x) = $____   (h) $f(3) = $____