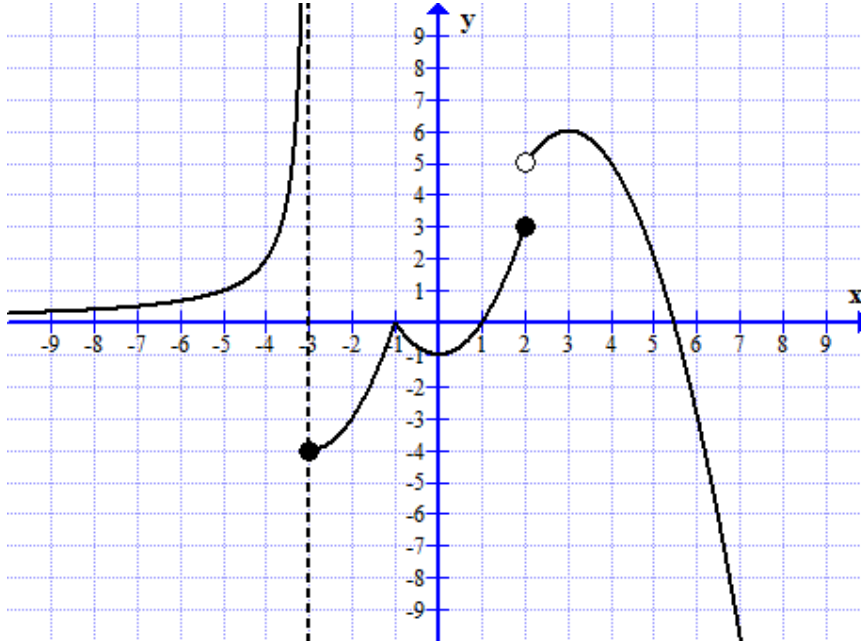**Worksheet Week 2.**

Problem 1. The graph of a function f is given below. Use the graph to find the limits below. Specify if a limit does not exist or is infinite.

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

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

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

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

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

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

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

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

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

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

Problem 2. Sketch the graph of a function $y = f(x)$ which satisfies **all** of the following conditions:

(i) the domain of f is (0, +∞);

(ii) $f(2) = f(4) = 0$;

(iii) $\lim_{x \to 0^+} f(x) = -\infty$;

(iv) $\lim_{x \to 2} f(x) = +\infty$;

(v) $\lim_{x \to 4^-} f(x) = 0$ and $\lim_{x \to 4^+} f(x) = 1$;

(vi) $\lim_{x \to +\infty} f(x) = 3$.

Problem 3. Compute each limit:

$$\lim_{x \to 2} \frac{x^2 + x - 6}{2 - x}$$

$$\lim_{x \to 2} \frac{x^2 + x - 6}{|2 - x|}$$

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