MATH 210: 9-6 WORKSHEET

(1) Give functions $f(x)$ whose limits $\lim_{x \to -\infty} f(x) = L$ and $\lim_{x \to \infty} f(x) = R$ satisfy:

- L and R both infinite
- $L = R$ both finite
- L finite and R infinite
- L infinite and R finite

- $L \neq R$ both finite
- L finite and R does not exist
- L infinite and R does not exist

Try to give these functions both by sketching a graph and by writing down a formula.

(2) Compute the following limits:

$$\lim_{x \to \infty} \frac{4(x^2 - 1)x}{3(x + 2)^2(x - 2)}$$

$$\lim_{x \to \infty} \frac{4(x^2 - 1)x^2}{3(x + 2)^2(x - 2)}$$

$$\lim_{x \to \infty} \frac{4(x^2 - 1)x}{3(x + 2)^2(x - 2)^2}$$

(3) Compute the following limits:

$$\lim_{x \to \infty} \frac{2^x}{x^2}$$

$$\lim_{x \to -\infty} \frac{2^x}{x^2}$$

$$\lim_{x \to \infty} \frac{\sqrt{x^4 - 1}}{4x^2 - 7x}$$

$$\lim_{x \to -\infty} \frac{\sqrt{x^4 - 1}}{4x^2 - 7x}$$

(4) Use the squeeze theorem to compute the limit

$$\lim_{x \to 1} (x - 1)^2 \sin x.$$