Homework Set 10

Limit Rules

(sect 1.4, 1.6, and 3.1)

Use Limit Laws to compute the following limits.

1.

$$\lim_{x \to -1} (x^2 + 1)(3x^4 - 2x - 7)$$

2.

$$\lim_{x \to 0} \frac{e^x + \cos x}{x^2 - 3x + 1}$$

Use an appropriate method to compute the following limits.

3.

$$\lim_{x \to 0} x \sin x$$

4.

$$\lim_{x \to 2} e^{x^2 - 3x}$$

5.

$$\lim_{x \to 2^-} \frac{1}{x - 2}$$

6.

$$\lim_{x \to 0} \frac{x - 5}{x^3 - 5x^2}$$

Use simplification to compute the following limits.

7.

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

8.

$$\lim_{x \to 0} \frac{(2+x)^3 - 8}{x}$$

9.

$$\lim_{x \to 3} \frac{x^2 - 9}{x^3 - x^2 - 6x}$$

10.

$$\lim_{x \to 7} \frac{\frac{1}{x} - \frac{1}{7}}{x - 7}$$

11.

$$\lim_{x \to -4} \frac{\sqrt{x^2 + 9} - 5}{x + 4}$$

12.

$$\lim_{x \to \infty} \frac{x^4 - 5x^2 + 2}{3x^4 + x^3 - 2x}$$

13.

$$\lim_{x \to -\infty} \frac{x^5 + 3x^4 - 7x}{2x^4 + x^2 + x - 1}$$

Use the Squeeze Theorem to compute the following limits.

14. Suppose $3x \le f(x) \le x^4 - x + 3$. Compute $\lim_{x \to 1} f(x)$.

15.

$$\lim_{x \to 1} (x^2 - \sqrt{x}) \cos\left(\frac{1}{x - 1}\right)$$