

HW 1, MA 1023

Due 1/24

Find the limits in Exercises 1-4.

1.

$$1) \lim_{x \rightarrow 0} \frac{\sin(x^2)}{x}$$

$$2) \lim_{x \rightarrow -1} \frac{3x^3 + 3}{4x^3 - x + 3}$$

2.

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

$$2) \lim_{x \rightarrow \infty} \frac{e^x + x^2}{e^x + x}$$

3.

$$1) \lim_{x \rightarrow 0^+} x^2 \ln x$$

$$2) \lim_{x \rightarrow 0^+} x^2 (\ln x)^2$$

4.

$$1) \lim_{x \rightarrow 0} \frac{xe^x}{e^x - 1}$$

$$2) \lim_{x \rightarrow 0^+} \left(\frac{3x+1}{x} - \frac{1}{\sin x} \right)$$

Evaluate the integrals in Exercises 5-8.

5.

$$1) \int_0^{\infty} \frac{1}{x+2} dx$$

$$2) \int_{-\infty}^2 \frac{2}{x^2 + 1} dx$$

6.

$$1) \int_0^1 \frac{1}{\sqrt{x}} dx$$

$$2) \int_0^4 \frac{1}{\sqrt{4-x}} dx$$

7.

$$\int_{-\infty}^{\infty} \frac{2x}{(x^2 + 4)^{\frac{3}{2}}} dx$$

8.

$$\int_{-8}^1 \frac{1}{x^{\frac{1}{3}}} dx$$