1. Evaluate the following integrals

(a)
$$\int \frac{\cos(\pi/x)}{x^2} dx$$
 (b) $\int \frac{e^x}{1+e^{2x}} dx$

2. Let
$$I = \int_0^1 x^3 \sin(x^2) dx$$

- (a) Find a value of n such that M_n approximates I accurate within 0.00001
 (b) Use a Taylor series to approximate I accurate within 0.00001
 (c) Find the value of I exactly by finding an antiderivative
- 3. Let R be the region in the first quadrant bounded by $y = -x^3 + 9x$ and the x-axis with $x \ge 0$. Find the volume when R is rotated about:

(a) the x-axis (c) the line x = -2(b) the y-axis (d) the line y = 30

4. Do the following improper integrals converge or diverge? Why?

(a)
$$\int_0^\infty \frac{2}{\sqrt{x+x^2}} dx$$
 (b) $\int_1^\infty \left(\frac{3}{5}\right)^x dx$