Note #1: This review is longer than the actual test (which has about 12 questions).
Note #2: You will be able to use 1 index card of your own notes (3 X 5, both sides) on the test.

1) \[ \int_{1}^{2} p^3 \ln p \, dp \]

2) \[ \int e^{-2x} \sin 2x \, dx \]

3) \[ \int \cos^4 x \, dx \]

4) \[ \int \sin^3 x \cos^8 x \, dx \]

5) \[ \int \frac{dx}{(5 - 4x - x^3)^{\frac{5}{2}}} \]

6) \[ \int x^3 \sqrt{x^2 + 4} \, dx \]

7) \[ \int \frac{x^2 + 2x - 1}{x^3 - x} \, dx \]

8) \[ \int \frac{x^3}{x^2 - 5x + 4} \, dx \]

9) Use a) the Trapezoid Rule, b) the Midpoint Rule, and c) Simpson’s Rule to approximate the integral \[ \int_{0}^{1} \cos(x^2) \, dx \], using \( n = 4 \).

10) Find the error of approximation for using Simpson’s Rule in #9.

11) \[ \int_{-\infty}^{0} \frac{1}{2x - 5} \, dx \]

12) \[ \int_{0}^{1} \frac{\ln x}{\sqrt{x}} \, dx \]
13) Find the length of the curve \( y = \frac{x^3}{6} + \frac{1}{2x}, \frac{1}{2} \leq x \leq 1 \).

14) Find the area of the surface obtained by rotating the curve \( y = x^3, 0 \leq x \leq 2 \) about the y-axis.

15) An aquarium 8 feet long, 8 feet wide, and 6 feet deep is full of water. Find:
   a) the hydrostatic pressure on the bottom of the aquarium
   b) the hydrostatic force on the bottom
   c) the hydrostatic force on one end of the aquarium

16) Find the centroid of the region bounded by \( y = \sqrt{x} \) and \( y = x \).