Math 1512 Exam 3 In-Class

NAME:_____

INSTRUCTIONS:

SHOW ALL OF YOUR WORK. Unsupported and illegible answers will not receive credit. Use **proper mathematical notation** to receive full credit. Absolutely NO electronic devices or notes are allowed during this test. May the Force be with you...

1. (12 pts) Evaluate the following indefinite integrals

   a.

$$\int \sqrt{x}(2x^6 - 4\sqrt[3]{x})\ dx$$

   b.

$$\int \frac{16\cos^2 w - 81\sin^2 w}{4\cos w - 9\sin w}\ dw$$

2. (18 pts) Use geometry to evaluate the following definite integral

$$\int_1^5 (|x-2| + \sqrt{-x^2+6x-5})\, dx.$$

(Hint: The equation under the square root is that of a circle. Complete the square to see it)

3. (15 pts) Simplify the following expression -

$$\frac{d}{dx}\int_x^{x^3} \frac{dp}{p^2+1}.$$

(Hint: By properties of integrals we can say that $\int_x^{x^3} \frac{dp}{p^2+1} = \int_x^0 \frac{dp}{p^2+1} + \int_0^{x^3} \frac{dp}{p^2+1}$)

4. (20 pts) Evaluate the following definite integrals

a.

$$\int_0^{\pi/4} \sec x(\sec x + \cos x)\ dx$$

b.

$$\int_{-\pi/4}^{\pi/4} \sec^2 x\ dx$$

c.

$$\int_0^5 e^x\ dx$$

(Hint: What was special about e^x when we took derivatives?)