Instructor: Ann Clifton   Name: _____

Do not turn this page until told to do so. You will have a total of 50 minutes to complete the exam. Unless otherwise stated, you **must** show all work to receive full credit. Unsupported or otherwise mysterious answers will **not receive credit.** If you require extra space, use the provided scrap paper and indicate that you have done so.

You may use a calculator **without a CAS** if you like, but a calculator is not necessary. NO PHONES ALLOWED.

Draw a turkey on this page if you read these directions in full. Cheating of any kind on the exam will not be tolerated and will result in a grade of 0%.

#	score	out of	#	score	out of
1		4	9		6
2		4	10		12
3		4	11		16
4		4	12		16
5		4	13		12
6		6	EC		5
7		6			
8		6	Total		100

Remember: This exam has no impact on your worth as a human being. You got this!!!
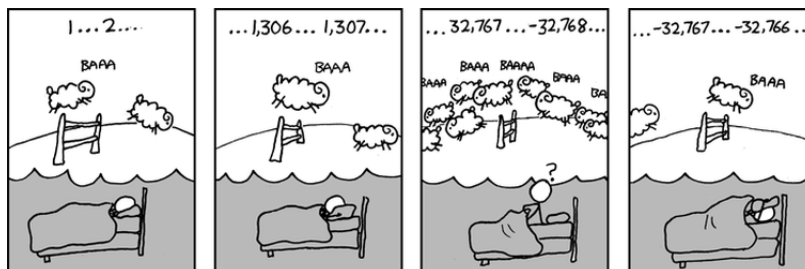
Fill in the blanks.

1. (4 points) If $f(x)$ is a continuous function on the interval $[a, b]$ and $F(x)$ is any antiderivative of $f(x)$, then

$$\int_a^b f(x)dx = \underline{\hspace{4cm}}$$

2. (4 points) Let $n \neq -1$ be a fixed number,

$$\int x^n dx = \underline{\hspace{4cm}}$$

3. (4 points)

$$\int \frac{1}{x}dx = \underline{\hspace{4cm}}$$

4. (4 points) Let k be any non-zero constant,

$$\int e^{kx} dx = \underline{\hspace{4cm}}$$

5. (4 points) Let a be a positive constant,

$$\int a^x dx = \underline{\hspace{4cm}}$$

Multiple Choice. Choose the best answer. (6 points each.)

6. Find the antiderivative $F(x)$ of the function $f(x) = 3x^2 + e^x$ which satisfies $F(0) = 2$.

    A. $F(x) = x^3 + e^x + 2$ **B.** $F(x) = x^3 + e^x + 1$

    C. $F(x) = x^3 + e^x + c$ **D.** $F(x) = x^3 + e^x + 3$

7. Find the definite integral $\int_1^4 \left(\frac{3}{x} + \frac{1}{\sqrt{x}} \right) dx$. Round your answer to three decimal places.

    A. -6.159 **B.** 8.826
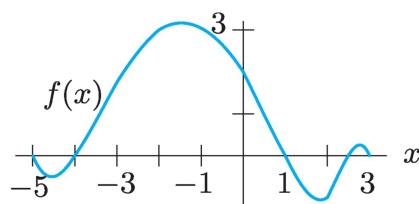
    C. -8.826 **D.** 6.159

8. Find the definite integral $\int_2^7 \left(\frac{1}{x} - \frac{2}{x^3} \right) dx$. Round your answer to three decimal places.

    A. 1.023 **B.** 0.334

    C. -1.023 **D.** 1.482

9. Using the graph below, determine whether $\int_{-5}^1 f(x)dx$ is positive, negative, approximately zero, or if there is not enough information.

    A. Positive   **B.** Negative

    C. Approximately Zero   **D.** Not enough information

Short Answer.

10. (12 points) Approximate the area under the curve $y = x^2$ on the interval $[0, 4]$ using $n = 4$ right-endpoint subintervals.

11. (16 points) Compute the following indefinite integrals.

(a) $\int (10x + 2)dx$

(b) $\int (36x^2 + 26x)dx$
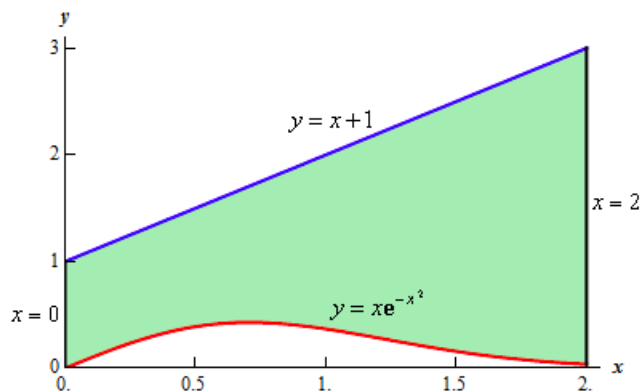
(c) $\int \frac{1}{\sqrt{x}}dx$

12. (16 points) Compute the following indefinite integrals.

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

(b) $\int \frac{4x}{2x^2+7}dx$

(c) $\int \frac{x}{\sqrt{x^2+1}}dx$

13. (12 points) Find the area of the region bounded by $y = xe^{-x^2}$ and $y = x + 1$ on the interval $[0, 2]$. *Set up but do* **not** *evaluate the integral.* The graph of the region is given below for reference.

Extra Credit. 5 points Evaluate the integral from the previous problem (the problem above). Give an **exact** answer; ie, compute the integral by hand without a calculator.