

Instructor: Ann Clifton

Name: _____

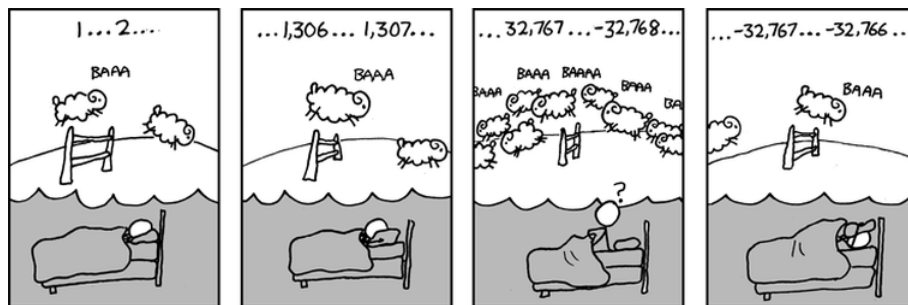
Do not turn this page until told to do so. You will have a total of 1 hour 40 minutes to complete the exam. Unless otherwise stated, you **must** show all work to receive full credit. Unsupported or otherwise mysterious answers will **not receive credit**. If you require extra space, use the provided 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 an elephant 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		3	9		6
2		4	10		20
3		3	11		16
4		3	12		15
5		3	13		5
6		4	14		10
7		4	EC		5
8		4	Total		100

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



Fill in the blanks.

1. (3 points) (Fundamental Theorem of Calculus) If $f(x)$ is a continuous function on the interval $[a, b]$ and $F(x)$ is any antiderivative of $f(x)$, then

$$\int_a^b f(x)dx = \underline{\hspace{10em}}$$

2. (4 points) Assume that $\int f(x)dx$ and $\int g(x)dx$ exist.

(a) $\int f(x) \pm g(x)dx = \underline{\hspace{10em}}$

(b) Let a be a number, $\int af(x)dx = \underline{\hspace{10em}}$

3. (3 points) Let $n \neq -1$ be a fixed number,

$$\int x^n dx = \underline{\hspace{10em}}$$

4. (3 points)

$$\int e^x dx = \underline{\hspace{10em}}$$

5. (3 points)

$$\int \frac{1}{x} dx = \underline{\hspace{10em}}$$

Multiple Choice. Choose the best answer. (4 points each.)

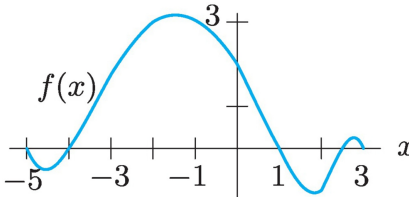
6. Find the antiderivative $F(x)$ of the function $f(x) = 3x^2 + e^x$ which satisfies $F(0) = 2$.

- 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 indefinite integral $\int \left(\frac{3}{x} + \frac{1}{\sqrt{x}} \right) dx$.

- A. $2\sqrt{x} + c$ B. $3 \ln x + \frac{2}{\sqrt{x}} + c$
C. $3 \ln |x| + 2\sqrt{x} + c$ D. $3 \ln |x| + \frac{2}{\sqrt{x}} + c$

8. 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.

9. (6 points) Approximate the area under the curve $y = x^2$ on the interval $[0, 4]$ using $n = 4$ right-endpoint subintervals.

10. (20 points) Compute the following indefinite integrals.

(a) $\int 7dx$

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

(c) $\int (36x^2 + 26x)dx$

(d) $\int x^2dx$

(e) $\int \frac{1}{\sqrt{x}}dx$

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

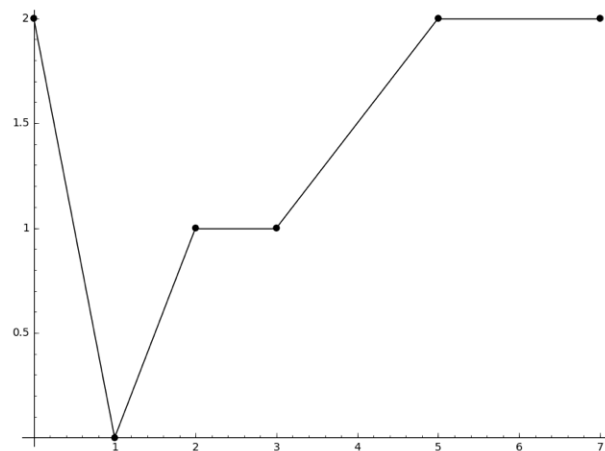
(a) $\int 25(x + 7)^{24} dx$

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

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

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

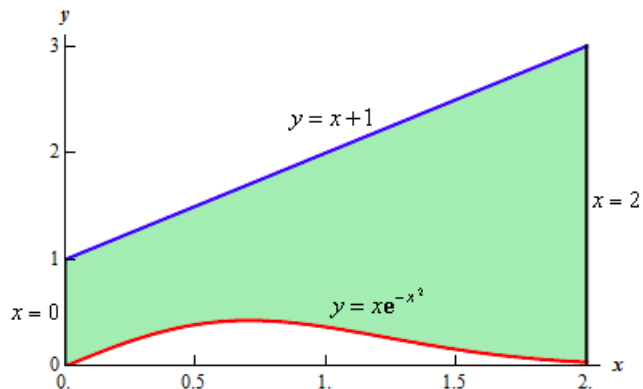
12. (15 points) Consider the function f given by the graph:



Compute $\int_0^7 f(x)dx$.

13. (5 points) What is your favorite color?

14. (10 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.



15. (Extra Credit 5 points) Evaluate the integral from number 14 (the problem above). Round your answer to four decimal places.