Please show all your work! Answers without supporting work will not be given credit.

Name: ____________________________

1. Logistics
   - Office Hours: MS 3957, Tuesday at 10a and Thursdays at 11a
   - SMC: MS 3974 Monday-Thursday 9a-3p (I’ll be there Thursdays at 10a)

2. Definite Integrals as Sums
   Express the following as limits of Riemann Sums:
   (a) \[ \int_{-1}^{1} (x^2 - x) \, dx \]
   (b) \[ \int_{-1}^{1} |x| \, dx \]
   (c) \[ \int_{-1}^{1} |\cos(x)| \, dx \]

3. What did the acorn say when he grew up?
   Use geometry to evaluate the following definite integrals (remember that the area is signed, i.e. area below the x-axis is negative):
   (a) \[ \int_{-1}^{1} |x| \, dx \]
   (b) \[ \int_{0}^{10} \sqrt{25 - (x - 5)^2} + 5 \, dx \]
   (c) \[ \int_{-1}^{4} x \, dx \]
4. **Just one more episode...**

Assume that over an 11 week period, the rate at which you binge watch Netflix is given by

\[ f(x) = \begin{cases} 
28 & 0 \leq x \leq 3 \\
31 - x & 3 < x \leq 9 \\
40 & 9 < x \leq 10 \\
10x - 100 & 10 < x \leq 11 
\end{cases} \]

where \( x \) is weeks and \( f(x) \) is hours watched per week. How many hours have you watched after the 11 weeks?

5. **The Fun(damental) Theorem of Calculus**

Evaluate the following definite integrals:

(a) \( \int_{-1}^{1} e^x \, dx \)

(b) \( \int_{0}^{1} x^{2017} \, dx \)

(c) \( \int_{0}^{\pi/2} \cos(x) \, dx \)