Name (Print): ———————————————

Canvas email: ———————————————

Teaching Assistant/Section: ———————————————

GT ID:

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Please clearly organize your work, show all steps, simplify all answers, and ⃞BOX your answers.

1. (5 points) Give the **general** anti-derivative of the following function:

$$f(x) = 2\sec x(\tan x - \sec x)$$

2. (5 points) Suppose $f(x)$ is an even function and $g(x)$ is an odd function. If $\int_0^3 f(x)\ dx = 5$ and $\int_0^3 g(x)\ dx = 2$, find $\int_{-3}^3 f(x) + g(x)\ dx$.

3. (10 points) Suppose $f(x) = x^2 + 1$. Use a general Riemann Sum

$$\lim_{n \to \infty} \sum_{k=1}^{n} f(x_k^*) \Delta x$$

to evaluate the definite integral of $f(x)$ on the interval $[-1,2]$, by following these steps:

(a) Find the length of each subinterval Δx in terms of n.

(b) Evaluate x_k^* as the right-hand endpoint of the subinterval.

(c) Evaluate the function at x_k^*, i.e. find $f(x_k^*)$. *Simplify.*

(d) Using the following summation formulas to simplify the sigma notation, find an expression for $R_n = \sum_{k=1}^{n} f(x_k^*) \Delta x$ that does not involve sigma's.

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2} \qquad \sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

(e) Using the sum you found in the previous step, find the definite integral.