

Name: _____

1. Evaluate $\int \frac{\ln(x)}{x^2} dx$.

20 pts

2. Evaluate $\int \tan^5 x \sec^3 x dx$.

20 pts

(OVER)

3. Evaluate $\int \frac{x+4}{x^2+2x+5} dx$. (Hint: A partial fraction decomposition will reproduce the original integrand. Instead complete the square in the denominator, and make a substitution that makes the denominator take a form like $u^2 + a^2$.)

20 pts

4. Evaluate $\int \sqrt{1 - 4x^2} dx$.

20 pts

5. Determine whether the integral $\int_{2\pi}^{\infty} \sin \theta \, d\theta$ is convergent or divergent. Evaluate it if it is convergent. SHOW YOUR WORK USING LIMITS.

10 pts

6. An elementary function can be formed via a sum, difference, product, quotient, and/or composition of polynomial, exponential, logarithmic, trigonometric, inverse trigonometric, hyperbolic, and/or inverse hyperbolic functions.

5 pts

- (a) Is the *derivative* of an elementary function guaranteed to be an elementary function?
Circle one: **YES** **NO**
- (b) Is the *antiderivative* of an elementary function guaranteed to be an elementary function?
Circle one: **YES** **NO**

7. Use one sentence to explain a method for *approximating* $\int_0^2 e^{-x^2} \, dx$. Illustrate your answer by sketching on top of Figure 1.

5 pts

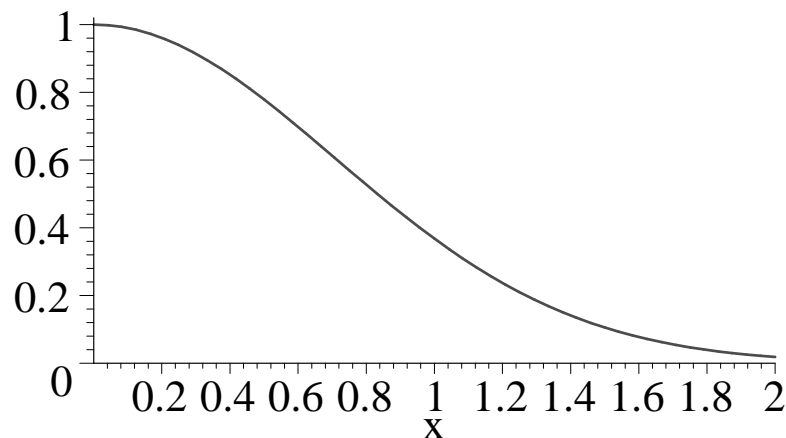


Figure 1: $y = \exp(-x^2)$