

Exam 3

Student Name: _____

Student ID#: _____

Each problem is worth 5 point. Give a complete solution to receive the full credit!

1. First use substitution and then use integration by parts to evaluate the integral $\int \sin(\sqrt{x}) dx$.

2. Evaluate the integral $\int \frac{\sqrt{x^2 - 9}}{x^3} dx$ using trigonometric substitution.

3. Evaluate the integral $\int_0^1 \frac{2x + 3}{(x + 1)^2} dx$.

4. Determine if the integral $\int_{-\infty}^6 x e^{\frac{x}{3}} dx$ is convergent or divergent. If it is convergent evaluate it.

5. Use the Comparison Theorem to determine whether the integral $\int_0^{\infty} \frac{\arctan(x)}{2 + e^x} dx$ is convergent or divergent.

6. Find the area enclosed by the curves $y = \cos(\pi x)$ and $y = 4x^2 - 1$.

7. Find the volume of the solid obtained by rotating the region bounded by the curves $y = 1 + \sec(x)$ and $y = 3$ about the $y = 1$.

8. The region bounded by the curve $x = y^2 + 1$ and $x = 2$ is rotated about the $y = -2$. Find the volume of the resulting solid.

9. The curve $x = 1 + 2y^2$, $1 \leq y \leq 2$ is rotated about the x -axis. Find the exact area of the surface obtained.

10. Find y' if $\cosh(x + y) = y^2 \sinh(x)$.