

East Los Angeles College
Department of Mathematics
Math 262
Test 3
Take Home Portion (20 points)

1. Evaluate the following improper integral

$$\int_0^{\infty} \frac{1}{x\sqrt{x^2 - 4}} dx$$

2. Show that $\int_{-\infty}^{\infty} \frac{1+x}{1+x^2} dx$ diverges

Let $F(s) = \int_0^{\infty} f(t)e^{-st} dt$ for a continuous function $f(t)$ over $t \geq 0$ be a Laplace Transform for some function f . The Domain of F is the values of s such that our improper integral converges.

3. If $f(t) = t$ determine the domain of $F(s)$.

4. If $f(t) = e^t$, determine the domain of $F(s)$.

Determine the exact area of the surface by rotating the curve about the x-axis.

5. $x = \frac{1}{3}(y^2 + 2)^{3/2}$ over $1 \leq x \leq$

Determine the exact area of the surface by rotating the curve about the y-axis.

6. $x = \sqrt{4 - y^2}$ over $0 \leq y \leq 2$

7. Determine the length of the curve.

$$\begin{aligned}x &= \frac{t}{1+t} \\y &= \ln(1+t) \\0 &\leq t \leq 2\end{aligned}$$

8. Find the area bounded by the parametric curve and the x-axis.

$$\begin{aligned}x &= 1 + e^t \\y &= t - t^2 \\0 &\leq t \leq 1\end{aligned}$$