

Math 105 Assignment 5
Due the week of February 21

1. (5 points) Find the area of the four-sided region in the first quadrant that is bounded on the left by the y -axis, below by the curve $x = 2\sqrt{y}$, above left by the curve $y = \sqrt{x} + 1$, and above right by the line $x = 3 - y$.

2. (5 points) Evaluate the following two integrals, or if they diverge, explain why:

(a) $\int_0^3 \frac{1}{(x-1)^{2/3}} dx$

(b) $\int_{-\infty}^{\infty} \frac{x^2}{9+x^6} dx$

3. (5 points) The small country of Svenborgia has \$10 billion in paper currency in circulation, and each day \$50 million comes into the country's banks. The government decides to introduce new currency by having the banks replace old bills with new ones whenever old currency comes into the banks. Let $x(t)$ denote the amount of new currency in circulation at time t , with $x(0) = 0$.

Formulate an initial value problem for $x(t)$, and solve it. How long will it take for the new bills to account for 90% of the currency in circulation?