

Chapter 8 and 9 Test Review

Find the arc length of each of the following function over the given interval:

1) $y = \frac{3}{7}x^{\frac{5}{2}}, 0 \leq x \leq 2$

2) $y = \frac{2}{3}x^2 - \frac{3}{4}\ln(x), 1 \leq x \leq 2$

3) $y = \ln(\sin(x)), \frac{\pi}{3} \leq x \leq \frac{\pi}{2}$

4) What's the area of the surface of revolution created when the curve defined by $y = 4 + 3x^2$, $1 \leq x \leq 2$ is rotated around the y -axis?

5) What's the area of the surface of revolution created when the curve defined by $x = \cos^2(y)$, $0 \leq y \leq \frac{\pi}{2}$ is rotated around the y -axis?

6) What's the area of the surface of revolution created when the curve defined by $y = x \ln(x)$, $1 \leq x \leq 2$ is rotated around the x -axis?

7) Solve the equation: $\frac{dy}{dx} = \frac{x^2-1}{2y^2}$.

8) Solve the equation: $x + 3y^2\sqrt{x^2+1}\frac{dy}{dx} = 0, y(0) = 1$

9)

A vat with 500 gallons of beer contains 4% alcohol (by volume). Beer with 6% alcohol is pumped into the vat at a rate of 5 gal/min and the mixture is pumped out at the same rate. What is the percentage of alcohol after an hour?

10)

If revenue flows into a company at a rate of $f(t) = 9000\sqrt{1+2t}$, where t is measured in years and $f(t)$ is measured in dollars per year, find the total revenue obtained in the first four years.