

Math 181
Spring 2010

Name _____

Homework #9
Due Tuesday, April 13
No late papers accepted! No excuses!

1. Evaluate the improper integrals.

a) $\int_1^{\infty} \frac{3x-1}{4x^3-x^2} dx$

b) $\int_0^{\infty} x^3 e^{-x} dx$

2. Solve the differential equation.

a) $2y' - y = xe^{x/2}$

b) $y^{-2} \frac{dy}{dx} = \frac{e^x}{e^{2x} + 1}, \quad y(0) = 1$

3. A tank contains 100 L of pure water. Brine that contains 0.1 kg of salt per liter enters the tank at a rate of 10 L/min. The solution is kept thoroughly mixed and drains from the tank at the same rate. How much salt is in the tank after 6 minutes?

4. Find an equation of the tangent(s) to the curve at the given point. Then use Maple to graph the curve and the tangent(s).

$$x = 6 \sin t$$

$$y = t^2 + t$$

$$(0,0)$$

5. Sketch the curve with the given polar equation.

$$r = 2 \cos(4\theta)$$

