

Math 251 section 004 Quiz 1

Write your name and PSU ID here:

Write your answers here:

1. B 2. D 3. C

1. Find the particular solution to the initial value problem

$$y' = \frac{\sin t}{2y}, \quad y(0) = -1$$

- (a) $y(t) = \sqrt{1 - \cos t}$ (b) $y(t) = -\sqrt{2 - \cos t}$
(c) $y(t) = -\sqrt{1 + \sin t}$ (d) $y(t) = -(1 + \cos t)/2$

2. Find an integrating factor to solve the equation:

$$ty' + (t + 1)y = t(t + 1)$$

- (a) $\mu = t + 1$ (b) $\mu = e^{t^2/2+t}$ (c) $\mu = e^{t+1}$ (d) $\mu = te^t$

3. A college student currently owes \$1000 on his credit card balance that carries an interest rate of 15% per year compounded continuously. Suppose the student's spending habit causes his credit card balance to increase continuously, net of his monthly payment, by \$100 every month. Which initial value problem below describes his credit card balance, as a function of time t onward, up to the moment when his credit limit is reached?

- (a) $y' = 0.15y + 100, y(0) = 1000$
(b) $y' = 0.15y - 1200, y(0) = 1000$
(c) $y' = 0.15y + 1200, y(0) = 1000$
(d) $y' = 0.15y + 1200, y(0) = -1000$