Math 240 - Quiz 3

Name _____

February 3, 2022

Score _____

This quiz is available in Canvas. It is due February 8.

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1. (2 points) Solve the initial value problem. Then find $y(1)$.

$$\frac{dy}{dx} + 2xy = x, \quad y(0) = -3$$

   (a) 1.7876
   (b) -9.0140
   (c) -0.7876
   (d) 1.2876

2. (2 points) Solve the initial value problem. Then find $y(2)$.

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

   (a) -9.1666
   (b) -8.5625
   (c) -10.0000
   (d) -2.0000

3. (2 points) A large tank is partially filled with 100 gallons of fluid in which 10 lb of salt is dissolved. Brine containing 0.5 lb of salt per gallon is pumped into the tank at a rate of 6 gallons per minute. The well-mixed solution is then pumped out at a slower rate of 4 gallons per minute. Find the number of pounds of salt in the tank after 40 minutes.

   (a) 87.63 lb
   (b) 77.65 lb
   (c) 64.38 lb
   (d) 24.40 lb

4. (2 points) Solve the initial value problem. Then assume $y \geq 0$ and find $y(0.25)$.

$$(\cos x \, \sin x - xy^2)\, dx + y(1 - x^2)\, dy = 0, \qquad y(0) = 2$$

   (a) 2.2952
   (b) 1.5966
   (c) 2.0497
   (d) 4.4214

5. (2 points) Solve the initial value problem. Then find $y(2)$.

$$\frac{dy}{dx} + \frac{1}{x}\, y = xy^2, \quad y(1) = 2$$

   (a) 2.0000
   (b) 1.5000
   (c) -1.0000
   (d) -1.5000