

Math 240 - Quiz 2

January 27, 2022

Name _____

Score _____

This quiz is available in Canvas. It is due February 1.

1. (2 points) The quantity P is growing in such a way that $\frac{dP}{dt} = kP$. Find $P(25)$ if $P(0) = 10$ and $P(10) = 180$.

- (a) 13746
- (b) 18080
- (c) 4500
- (d) 29160

2. (1 point) Determine whether we should expect a unique solution, no solution, or more than one solution.

$$x \frac{dy}{dx} = (2y - 4)^{1/3}, \quad y(4) = 2$$

- (a) We expect a unique solution.
- (b) We expect a solution, but not necessarily a single solution.
- (c) We expect no solution.

3. (1 point) Determine whether we should expect a unique solution, no solution, or more than one solution.

$$\frac{dy}{dx} + xe^x y = x^3 \cos x, \quad y(-1) = \sqrt{2}$$

- (a) We expect a unique solution.
- (b) We expect a solution, but not necessarily a single solution.
- (c) We expect no solution.

4. (2 points) Solve. Then determine $y(2)$.

$$(\tan x) \frac{dy}{dx} = y, \quad y(\pi/2) = \pi/2$$

- (a) 0.05482
- (b) 1.4283
- (c) 0.6060
- (d) 1.4801

5. (2 points) Use Newton's law of cooling to solve: A cake is removed from an oven at 350°F and left to cool in a room at 70°F . After 30 minutes, the temperature of the cake is 150°F . When will the temperature be 110°F ?

- (a) About 39 minutes
- (b) About 42 minutes
- (c) About 52 minutes
- (d) About 47 minutes

6. (2 points) Solve. Then determine $y(3)$.

$$x \frac{dy}{dx} = 2y + x^3 \cos x, \quad y(\pi) = 1$$

- (a) 2.2701
- (b) 3.4761
- (c) 2.1820
- (d) 1.2701