Quiz 7

Graded

Student

Colin Cano

Total Points

6 / 10 pts

Question 1

Death Star

2 / 4 pts

Elements are incorrect. Select all that apply.

✔ **− 1 pt** Student does not correctly plug in $r = 60 * (.5) = 30$.

8

✔ **− 1 pt** Student does not correctly plug in $\frac{dr}{dt} = 60$.

7

6 This last r should be r'

Question 2

Zombie Breakout

2 / 3 pts

Elements are incorrect. Select all that apply.

✔ **− 1 pt** Student does not correctly solve for r using $10e^{r1} = 1000$

1

Question 3

Related Rates

2 / 3 pts

Elements are incorrect. Select all that apply.

✔ **− 0.5 pts** The student does not plug in $\frac{dy}{dt} = 4$ correctly, or does not plug in $(x, y) = (1, 2)$ correctly.

5 You reversed $x = 1$ and $y = 2$

✔ **− 0.5 pts** An algebra mistake was made.

3

2 This is an implicit equation $yx^2 = 2$. It is not a function $f(x) = ...$

4 You missed $\frac{dx}{dt}$ here, although it is in the next line

MATH:1850 Quiz 7 Fall 2024

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1. A moon-sized battle station explodes in outer space. The spherical explosion of shrapnel travels at $60\frac{\text{km}}{\text{sec}}$. How fast is the volume of the sphere increasing after .5 seconds? **You may leave your answer in terms of π.** *Hint:* The formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$.

$r(0) = 0$
$r(1) = 0 + 60$
60 km/s $t = .5$

$\frac{dV}{dt} = 4\pi r^2 \cdot$ (6)

$\frac{dV}{dt}(0.5) =$ (8) $\pi(60)^2$ (7) km/s

2. In a crowded city, an initial population of 10 zombies escapes from a secret lab and begins infecting humans. Their population grows to 1,000 zombies in just 1 hour. The zombies infect people at a rate proportional to the size of the zombie population. Find an expression for the number of zombies after t hours.

$P_0 e^{kt}$

$P_0 = 10$
$P_1 = 1000$

$P(t) = P_0 \cdot e^{kt}$
$= 10e^{k \cdot 1}$
$\frac{\ln(n)}{10} =$ (1) k

3. If $yx^2 = 2$ and $\frac{dy}{dt} = 4$, find $\frac{dx}{dt}$ when $(x, y) = (1, 2)$.

(2) $f(x) = y(t) \cdot x(t)^2$
$f'(x) = y'(t) \cdot x^2 + y(t) \cdot 2x(t)$ (4) $= 0$
$4 \cdot 4$ (5) $+ 1 \cdot 4 \cdot \frac{dx}{dt} = 0$
$\frac{4\frac{dx}{dt}}{4} =$ (3) $-\frac{17}{4}$

$\frac{dx}{dt} = -\frac{17}{4}$ at $(1, 2)$

SCRATCH PAPER