

Name \_\_\_\_\_

- You have 20 minutes
- No calculators
- Show sufficient work

1. (3 points) Suppose that  $A$  represents the number of grams of a radioactive substance at time  $t$  seconds. Given that  $\frac{dA}{dt} = -0.2A$ , how long does it take 20 grams of this substance to be reduced to 4 grams?

2. (4 points) The height of a remote-controlled drone in feet above ground for  $t \geq 0$  seconds is given by the following function.

$$h(t) = \frac{t^{10}}{3e^{2t}}$$

What is the maximum height obtained by the drone?

3. (3 points) A street light is mounted at the top of a  $630\text{ cm}$  pole. As a woman walks away from the pole, the tip of her shadow is moving  $40\%$  faster than she is moving. What is the woman's height?