

Name _____

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

1. (4 points) The height of a remote-controlled drone in feet above ground for $t \geq 0$ seconds is given by the following function.

$$h(t) = 3t^2e^{-t/10}$$

What is the maximum height obtained by the drone?

2. (3 points) There is a launch site of a hot-air balloon on the ground 20 meters away from an observer. The balloon rises vertically at a constant rate of 2 meters per second. How quickly is the angle of elevation of the balloon increasing 5 seconds after its launch?

3. (3 points) Determine the formula for a function whose graph passes through the point $(6, e^{10})$ and has the property that for each point on the curve, the slope of the curve is equal to one half its y -coordinate.