

Name _____

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

1. (4 points) There is a launch site for 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?

2. (3 points) At each point on the curve $y = f(x)$, the slope of the curve is equal to its y -coordinate multiplied by $1/4$. If its graph goes through the point $(\ln(81), 36)$, then find a formula for $f(x)$. Simplify your answer.

3. (3 points) A bullet is shot upward from the surface of a planet so that its height in meters until coming to rest is given by the equation $s(t) = 195t - 6.5t^2$ where t is measured in seconds. At what time does the bullet reach its maximum height?