

Name _____

RULES FOR PART 2 OF THIS TEST:

- You may use a calculator.
 - Show all of your work for each problem.
 - All of your answers should be simplified and correctly rounded off to two places after the decimal point.
1. (10 points) A small balloon is released at a point 250 feet away from an observer, who is on level ground. If the balloon goes straight up at a rate of 10 feet per second, how fast is the distance from the observer to the balloon increasing when the balloon is 100 feet high?

2. (15 points) A rock is thrown upward from the surface of the moon. Between the time that the rock is thrown and the time that the rock hits the ground, the rock's height is given by the formula $s(t) = 24t - 0.8t^2$, where t is the number of seconds since the rock is first thrown and $s(t)$ is measured in meters above the moon's surface.

(a) Find a formula for the rock's velocity at time t .

(b) Find a formula for the rock's acceleration at time t .

(c) How fast was the rock moving, and in which direction, at the end of 25 seconds?

(d) What is the rock's maximum height and at what time does it reach that height?

(e) Find two different times at which the speed of the rock was 20 meters per second.

3. (10 points) A farmer wishes to fence off two identical adjoining rectangular pens, each with an area of 800 square feet, as shown in the figure below. What are the values of x and y so that the least amount of fencing is required?

