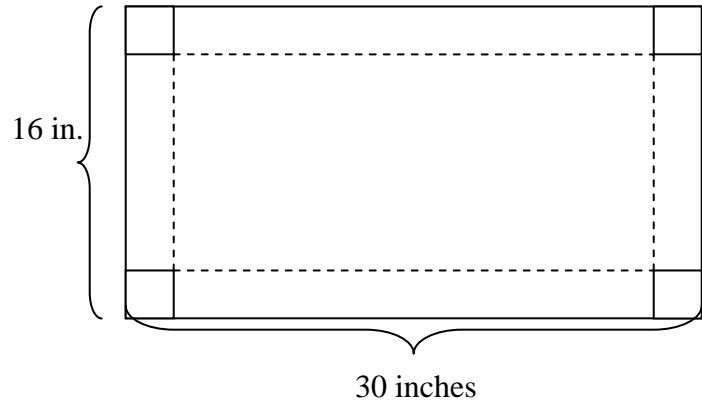


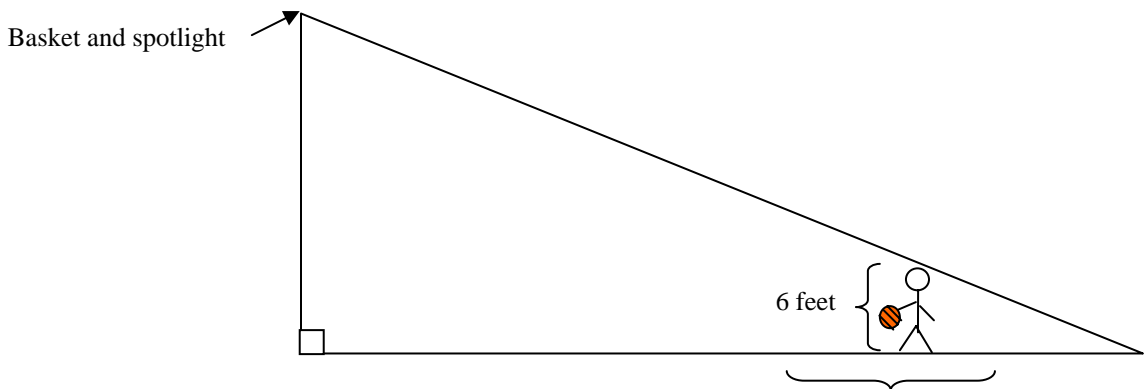
Fall Review 2

Name _____

- 1) Adrienne needs to make an open box from a 16 inch by 30 inch piece of cardboard by cutting out square of equal size from the four corners and bending up the sides. But instead, she just sits at the table whining that it can't be done. Since Lauren is no help either, Samantha now have to do it for her. What dimensions should she use to obtain a box with the largest possible volume?



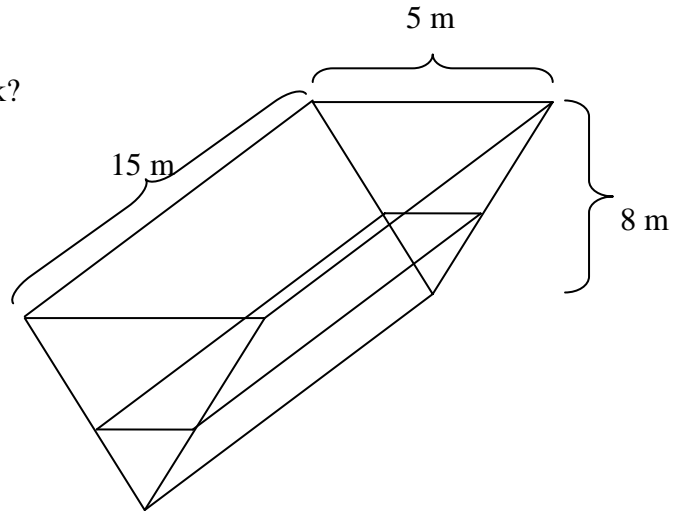
- 2) Mussman, claiming to be 6 ft, hopes to dunk a ball over Hamidou in a basket that has been moved from 10 feet high to 18 feet high. Alvin and Matt, having bet against him, mount a camera with a spotlight at the rim of the basket to film his attempt. Mussman runs toward the basket at 6 ft/sec with the spotlight casting a shadow behind him. The diagram of the spotlight, Mussman, and his shadow is shown below.



- a) At what rate is the size of his shadow changing?
(This rate should be negative)
- b) How fast is the tip of his shadow moving along the ground?

- 3) While Garrett is whining about having too much calculus homework, Natalie and Jennica have to observe the filling of a trough 15 meters long, 5 meters wide, and 8 meters deep all by herself. The water is flowing into the trough at a constant rate. When the height of the water reaches 4 meters, she notices that the height is increasing at a rate of 2 m/min. ($V = \frac{1}{2} bhl$)

- a) At what rate is the fuel flowing into the tank?



- b) How long will it take to fill the tank?

4) The graph of $f'(x)$ on the interval $-5 \leq x \leq 5$ is shown below. Find and justify all values of x for which $f(x)$

a) has a relative maximum (if any)

b) has a relative minimum (if any)

c) is concave down.

d) Has a critical point that is also a point of inflection.

e) Given that the graph of f crosses the origin, sketch a graph of f on the axes below.

