Similar Triangles

Every problem in this assignment has a similar triangles problem hidden inside it. Your job is to write an equation for those similar triangles. You will have to determine your variables, which means every problem should start with a list of all your variables and what they mean. If you need a picture to describe what a variable means, then provide arrows that show how far that variable measures. Failure to properly denote your variables will result in a complete loss of points for that problem.

1. A conical tank with the point down has height 3 meters and radius 2 meters at the top. The tank has water in it, but the tank is not full.

2. A 6-foot tall man stands a certain distance from a 15-foot tall lamppost. The lamppost casts a shadow of the man on the ground.

3. A rectangle is inscribed in right triangle with legs of length 3 and 4.

4. Consider a rectangle with sides of length $H$ and $L$. Now circumscribe a larger rectangle around the first rectangle.

5. Consider an isosceles triangle with repeated side of length $s$. Now place a rectangle of length $h$ by $b$ inside the triangle, where the side of the rectangle of length $b$ lies on the nonrepeated side of the triangle.

6. A pole is carried horizontally around a corner joining corridors of widths 8 feet and 4 feet.

7. Consider a right-circular cone with the point up, and place a right-circular cone inside the first cone with point down.

8. Consider a right-circular cone. Take a slice through the cone in order to measure the cross-sectional area.

9. Consider a ramp of height 2 feet and length 6 feet. Cut through the ramp vertically in order to find the height of the ramp at the cut.

10. Consider the trough in Figure 11 on page 339 of the book. If the trough has water in it, but is not full, find a similar triangles problem within the trough.