1) Consider the triangle whose vertices are the points (1, −2, 4), (−5, −12, 10), and (10, 13, −5).
   a) Prove that this triangle is isosceles.
   b) Is this triangle equilateral? Explain.

2) Do the points (0, 2, 3) (3, −4, −2) (−10, 3, 7) all lie on the same line? Explain.

3) What is the (shortest) distance from the point (1, 2, 3) to
   a) the x-z plane?
   b) the x axis?

4) Write a sentence (or two) to precisely describe the surface whose equation is
   \[ x^2 + y^2 + z^2 - 4x + 6y - 2z + 10 = 0. \]

5) Find all unit vectors parallel to the vector \( \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix} \).

6) Do problem 34 on page 796 in the text. However, let’s change the numbers. The rope on the left is now 4 m long; the rope on the right is 6 m long. The rope on the left makes an angle of 60 degrees with the horizontal; the rope on the right makes an angle of 45 degrees with the horizontal. The decoration has a mass of 8 kg. Give exact answers and decimal approximations.

**Be careful.** We did an example like this one in class, where we were given the *weight* of an object. In this example, you are given the *mass* of an object. Mass and weight are NOT the same. How are they related?