1. Find the length of both missing sides, $x$ and $y$.

\[
\text{Diagram with angles and sides labeled:}
\]

2. Find the length of each missing angle on the triangle.

\[
\text{Diagram with angles and sides labeled:}
\]

3. Calculate the angles formed by a diagonal drawn on an $8\frac{1}{2} \times 11$ inch sheet of paper. [You can check this answer by using a real sheet of paper.]

4. A man standing near a streetlamp casts a shadow 10 feet long. Given that the angle of elevation from the tip of the man’s shadow to the top of the lamp, where the bulb is shining, is $29^\circ$, how tall is the man (in feet)?

5. Find the area of the triangle below.

\[
\text{Diagram with sides labeled:}
\]
6. What is the area of an equilateral triangle with all side lengths equal to 10cm?

7. During an equinox, the sun’s position is directly over the equator, so that for a person standing on the equator, the sunrise and sunset are exactly 12 hours apart (at 6am and 6pm respectively), and noon occurs when the sun is directly overhead. Suppose that you are in Quito, Ecuador, right on the equator, during the equinox, and you are standing out in the sun with a measuring tape.
   
   (a) How tall are you, in feet?

   (b) At 7:00am, the angle of elevation of the sun is about 15°. How long will your shadow be at this point?

   (c) At what time will the angle of elevation of the sun be 75°?

   (d) At what time(s) will your shadow length be equal to your height?

   (e) At what time(s) will your shadow length be equal to twice your height?