

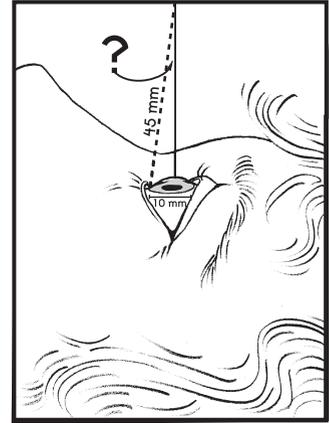
## Eye Exam and Lookout Point

### Eye Exam

An eye surgeon must perform an operation on a person who has pressure behind the cornea. (The cornea is the shaded area in the picture.) The surgeon will use a laser to make small holes along the edge of the cornea.

The patient will be lying on the operating table, and the laser will be above her. More precisely, the laser will be directly above her pupil (the center of her eye). The laser is 45 millimeters from the outer edge of the cornea. The diameter of the cornea is 10 millimeters.

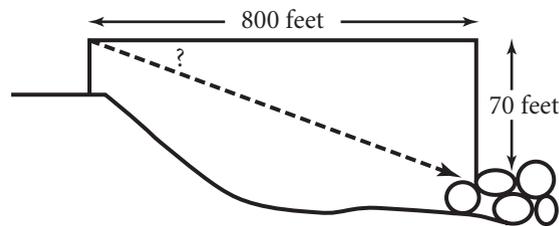
The surgeon needs to find the angle at which to set the laser. This is the angle shown in the diagram as “?”.



1. Use trigonometry to set up an equation that could be used to find this angle.
2. Use your calculator to get an approximate solution to this equation.

### Lookout Point

The Park Service has created a lookout point over a beautiful valley that contains some interesting natural features. The service will be posting signs telling visitors how to adjust the lookout point telescope to find these features.



One very interesting rock formation is 70 feet lower than the telescope and 800 feet out from the telescope.

The telescope always resets to horizontal before each visitor uses it. By how big an angle should the Park Service tell people to tilt the telescope in order to see this rock formation?

## Pole Cat

Poor Diane. Her cat, Wanda Ann, has climbed up a telephone pole and can't get down.

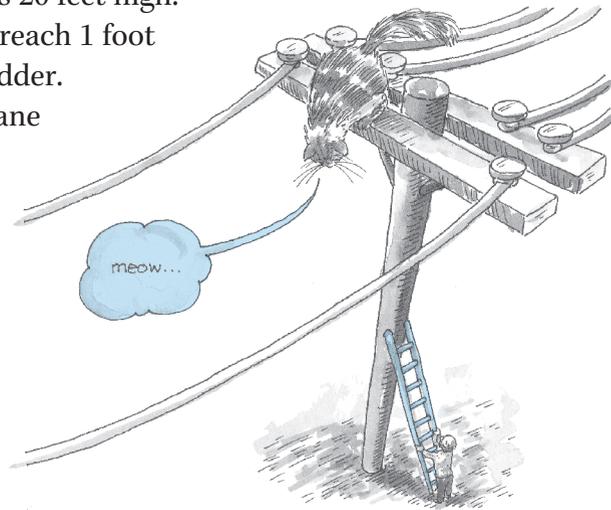
The crossbar of the telephone pole is 20 feet high.

Diane is 5 feet 6 inches tall and can reach 1 foot above her head.

She has a 15-foot ladder.

To keep the ladder from tipping, Diane must lean it against the pole at an angle of  $70^\circ$  to the ground.

Can Diane save Wanda Ann?



## Dog in a Ditch

Oscar and Rasheed are identical twins. They are both 6 feet tall. They are on opposite sides of a ditch that is 30 feet wide. Their dog, Earl, is at the bottom of the ditch.

Earl can get out if he wants to. When Oscar looks at Earl, his line of sight makes a  $75^\circ$  angle below the horizontal. When Rasheed looks at Earl, his line of sight makes a  $40^\circ$  angle below horizontal. How deep is the ditch?

