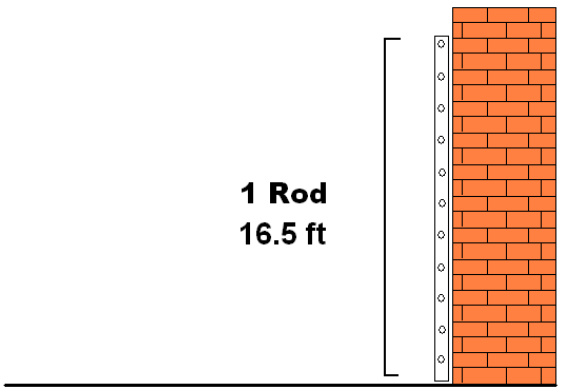
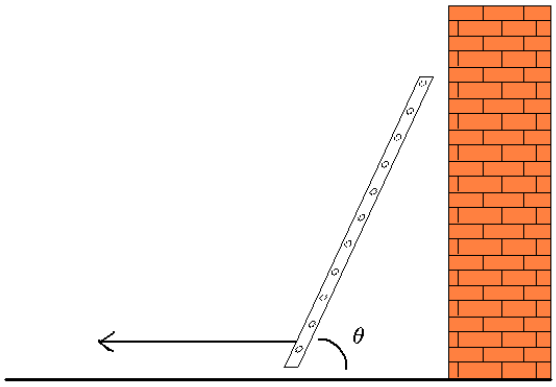
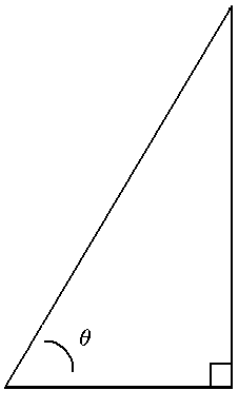
Trig Functions in Motion NAME_____ HOUR_____

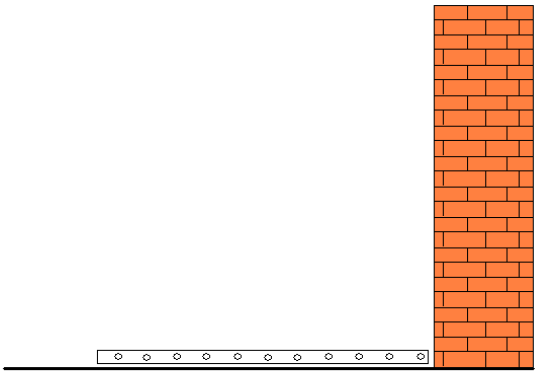
In the seventeenth century, farmers used a common unit to survey their farmland. This unit was called a 'rod' and is equivalent to 16.5 ft today.

A ladder of length one rod resting up against a wall is slowly pulled away from the wall at its base. During this motion, the top of the ladder slides down the wall as the base of the ladder travels away from the wall. This creates a right triangle with the ladder, the wall, and the ground as sides. We will label the angle created by the ground and the ladder angle θ.



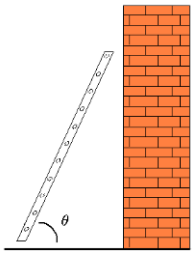






Section I

Label the sides of the triangle (opposite, adjacent, and hypotenuse) in terms of the story and write them down.



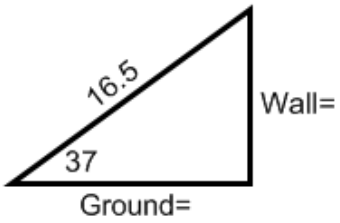
What do sin θ, cos θ, and tan θ mean in the story?

sin θ =

cos θ =

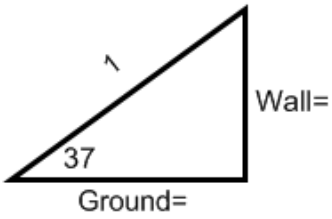
tan θ =

When θ = 37 degrees, what is the length of the ground in feet? What is the length of the wall in feet?



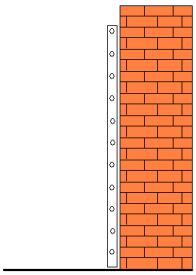
What does the sin 37=.60 mean in the story?

Now recalculate the length of the wall and the ground using the ladder equaling 1 rod?

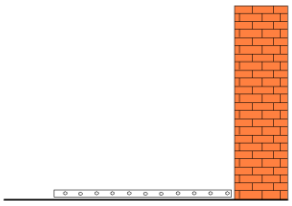


Do we prefer a ladder length 16.5 or length 1? Explain.

What is the value of theta before the ladder begins to move?



When the ladder is resting on the ground, what is the value of theta?



Calculate sin θ, cos θ, and tan θ below for thetas representing the starting and ending points of the ladder.

Sin 0°=

Cos 0°=

Tan 0°=

Sin 90°=

Cos 90°=

Tan 90°=

Go back and explain each of the 6 problems above in the story (Hint: Compare the length of the wall to the length of the ground)

Section II

For what value of theta will sin θ = cos θ? What does that mean in the story?

Draw the picture associated with sin θ = cos θ?

What is the value of tan θ when sin θ = cos θ? Why is that the case?

How do sin and cos relate to each other within the same triangle?

When will 2*(sin θ) = cos θ? What does this means in the story?

Sin, cos, and tan are functions. What type of numbers are the inputs and the outputs.

Inputs: Outputs:

What are the domain and range of sin, cos, and tan within this story?

sin θ D cos θ D tan θ D

R R R

Explain again why we like a ladder of length 1