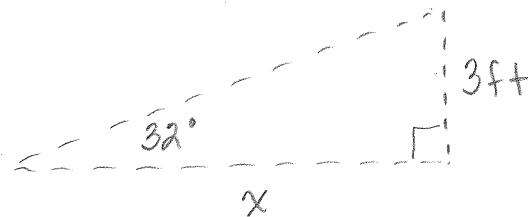


# Problem Solving

## STATION # 1

A ramp is used to load a 4-wheeler onto a truck bed that is 3 feet above the ground. The angle that the ramp makes with the ground is  $32^\circ$ . What is the horizontal distance covered by the ramp? Round to the nearest hundredth.



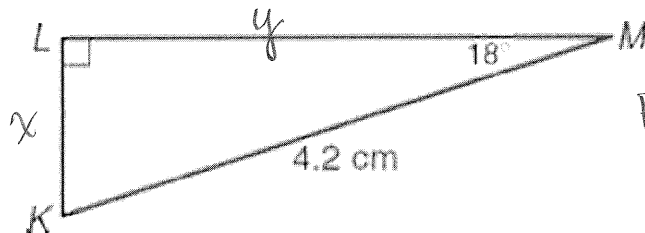
$$\tan 32 = \frac{3}{x}$$
$$\frac{x \tan 32}{\tan 32} = \frac{3}{\tan 32}$$

$$x = 4.80 \text{ ft}$$

# Problem Solving

## STATION # 2

Find the perimeter of the triangle. Round to the nearest hundredth.



$$P = 1.30 + 3.99 + 4.2$$

$$P = 9.49 \text{ cm}$$

$$\sin 18 = \frac{x}{4.2}$$

$$4.2 \sin 18 = x$$

$$x = 1.30 \text{ cm}$$

$$\cos 18 = \frac{y}{4.2}$$

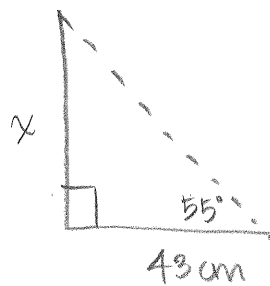
$$4.2 \cos 18 = y$$

$$y = 3.99$$

# Problem Solving

## STATION # 3

A right triangle has an angle that measures  $55^\circ$ . The leg adjacent to this angle has a length of 43 cm. What is the length of the other leg of the triangle? Round to the nearest tenth.



$$\tan 55 = \frac{x}{43}$$

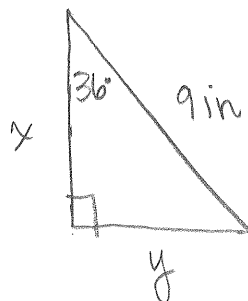
$$43 \tan 55 = x$$

$$x = 61.4 \text{ cm}$$

# Problem Solving

## STATION # 4

The hypotenuse of a right triangle measures 9 inches, and one of the acute angles measures  $36^\circ$ . What is the area of the triangle? Round to the nearest square inch.



$$A = \frac{1}{2}bh = \frac{1}{2}(5.29)(7.28) = 19 \text{ in}^2$$

$$\sin 36 = \frac{y}{9} \quad \cos 36 = \frac{x}{9}$$

$$9 \sin 36 = y \quad 9 \cos 36 = x$$

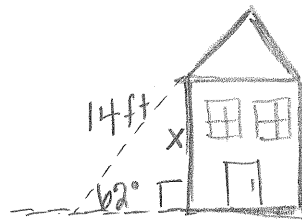
$$y = 5.29 \text{ in}$$

$$x = 7.28 \text{ in}$$

# Problem Solving

## STATION # 5

A 14-foot ladder makes a  $62^\circ$  angle with the ground. To the nearest foot, how far up the house does the ladder reach?



$$\sin 62 = \frac{x}{14}$$

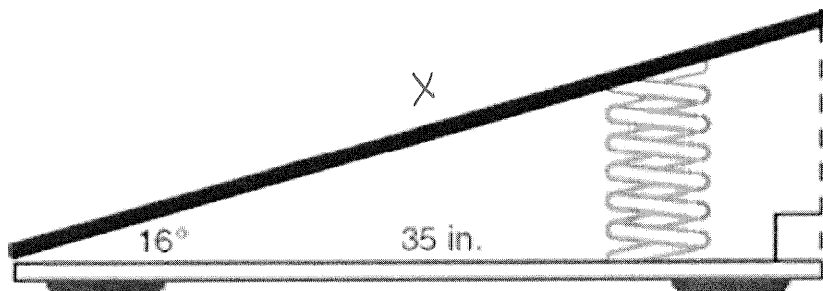
$$14 \sin 62 = x$$

$x = 12.36 \text{ ft.}$   
 $\approx 12 \text{ ft.}$

# Problem Solving

## STATION # 6

To the nearest inch, what is the length of the springboard shown below?



$$\cos 16 = \frac{35}{x}$$

$$\frac{x \cos 16 = 35}{\cos 16 \quad \cos 16}$$

$x = 36.41 \text{ in.}$   
 $\approx 36 \text{ in.}$

# Problem Solving

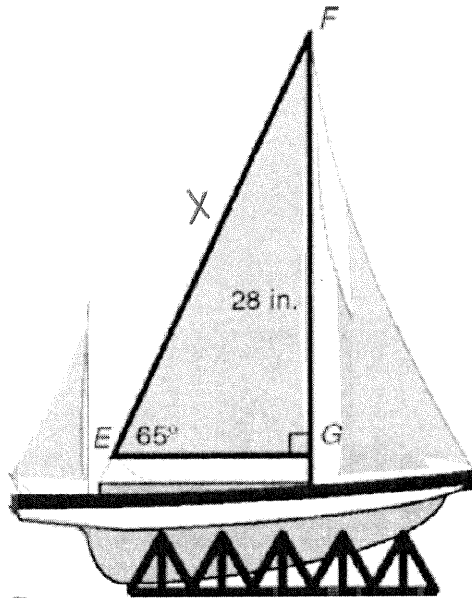
## STATION # 7

What is  $EF$ ,  
the measure of  
the longest side  
of the sail on the  
model? Round to  
the nearest inch.

$$\sin 65 = \frac{28}{x}$$

$$\frac{x \sin 65 = 28}{\sin 65 \quad \sin 65}$$

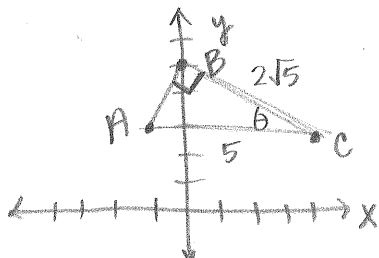
$x = 30.89 \text{ in}$   
 $\rightarrow 31 \text{ in}$



# Problem Solving

## STATION # 8

Right triangle  $ABC$  is graphed on the  
coordinate plane and has vertices at  
 $A(-1, 3)$ ,  $B(0, 5)$ , and  $C(4, 3)$ . What is the  
measure of  $\angle C$  to the nearest degree?



$$AC = \sqrt{(-1-4)^2 + (3-3)^2} = \sqrt{(-5)^2} = \sqrt{25} = 5$$

$$BC = \sqrt{(0-4)^2 + (5-3)^2} = \sqrt{16+4} = \sqrt{20} = 2\sqrt{5}$$

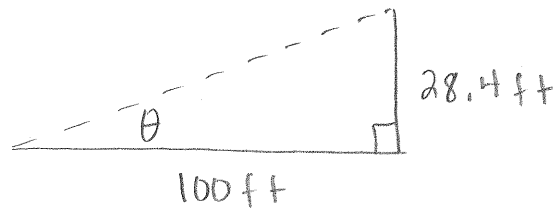
$$m\angle C: \cos C = \frac{2\sqrt{5}}{5} \Rightarrow \cos^{-1}\left(\frac{2\sqrt{5}}{5}\right) = \theta$$

$\theta = 27^\circ$

# Problem Solving

## STATION # 9

A road has a grade of 28.4%. This means that the road rises 28.4 ft over a horizontal distance of 100 ft. What angle does the hill make with a horizontal line? Round to the nearest degree.



$$\tan \theta = \frac{28.4}{100}$$

$$\tan^{-1}\left(\frac{28.4}{100}\right) = \theta$$

$$\theta = 15.85^\circ$$

$$\theta \approx 16^\circ$$

# Problem Solving

## STATION # 10

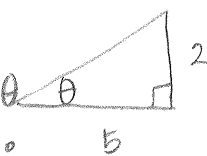
Pet ramps for loading larger dogs into vehicles usually have slopes between  $\frac{2}{5}$  and  $\frac{1}{2}$ . What is the range of angle measures that most pet ramps make with a horizontal line? Round to the nearest degree.

$$22^\circ \leq \theta \leq 27^\circ$$

$$\tan \theta = \frac{2}{5}$$

$$\tan^{-1}\left(\frac{2}{5}\right) = \theta$$

$$\theta = 21.8^\circ$$



OR



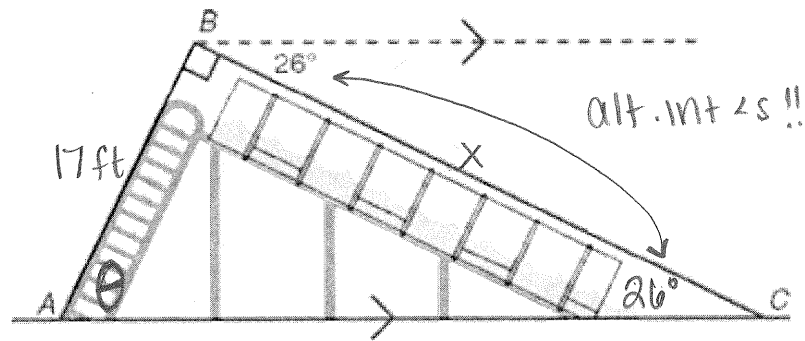
$$\tan \theta = \frac{1}{2}$$

$$\tan^{-1}\left(\frac{1}{2}\right) = \theta$$

$$\theta = 26.57^\circ$$

# Problem Solving

## STATION # 11



The ladder, represented by  $\overline{AB}$ , is 17 feet long.

What is the measure of angle A, the angle that the ladder makes with a horizontal line?

$$\tan 26^\circ = \frac{17}{x}$$

$$\frac{x \tan 26^\circ}{\tan 26^\circ \tan 26^\circ} = 17$$

$$x = 34.86 \text{ ft}$$

$$\tan \theta = \frac{34.86}{17}$$

$$\tan^{-1}\left(\frac{34.86}{17}\right) = \theta$$

$$\theta = 64^\circ$$

OR

$$m\angle A = 180 - 90 - 26$$

$$m\angle A = 64^\circ$$

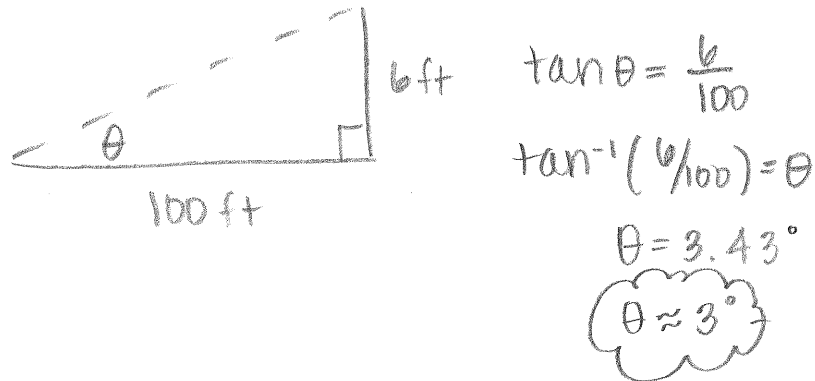
What is  $BC$ , the length of the slide?  
Round to the nearest tenth of a foot.

$$BC = 34.9 \text{ ft.}$$

# Problem Solving

## STATION # 12

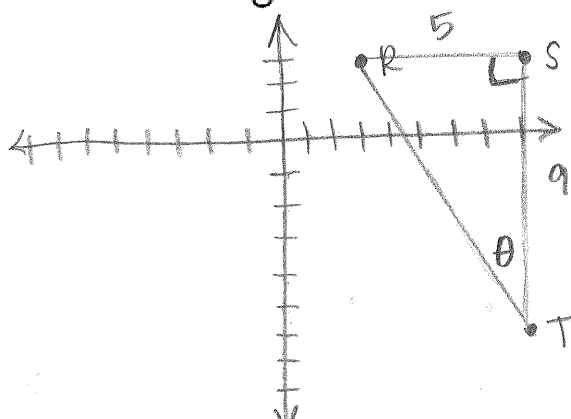
Janelle sets her treadmill grade to 6%.  
What is the angle that the treadmill  
surface makes with a horizontal line?  
Round to the nearest degree.



# Problem Solving

## STATION # 13

The coordinates of the vertices of  $\triangle RST$   
are  $R(3, 3)$ ,  $S(8, 3)$ , and  $T(8, -6)$ . What is  
the measure of angle  $T$ ? Round to the  
nearest degree.



$$RS = \sqrt{(3-8)^2 + (3-3)^2} = \sqrt{25+0} = 5$$

$$ST = \sqrt{(8-8)^2 + (3-(-6))^2} = \sqrt{0+81} = 9$$

$$\tan \theta = \frac{5}{9}$$

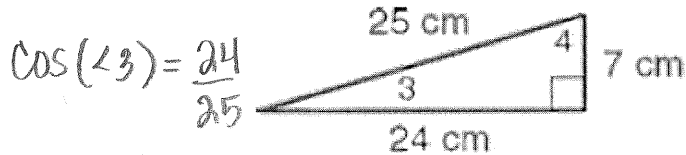
$$\tan^{-1}\left(\frac{5}{9}\right) = \theta$$

$$\theta = 29^\circ$$

# Problem Solving

## STATION # 14

If  $\cos A = 0.28$ , which angle in the triangles below is  $\angle A$ ?  $\angle 4$

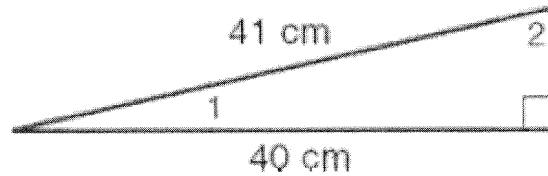


$$\cos(\angle 1) = \frac{40}{41}$$

$$\cos(\angle 3) = 0.96$$

$$\cos(\angle 4) = \frac{1}{25}$$

$$\cos(\angle 4) = 0.28$$



$$\cos(\angle 1) = 0.98$$

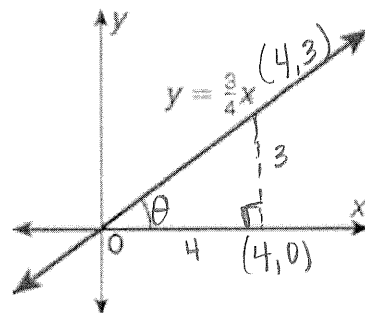
$$\cos(\angle 2) = \frac{9}{41}$$

$$\cos(\angle 2) = 0.22$$

# Problem Solving

## STATION # 15

Find the measure of the acute angle formed by the graph of  $y = \frac{3}{4}x$  and the x-axis. Round to the nearest degree.



$$\tan \theta = \frac{3}{4}$$

$$\tan^{-1}\left(\frac{3}{4}\right) = \theta$$

$$\theta = 36.87^\circ$$

$$\theta \approx 37^\circ$$