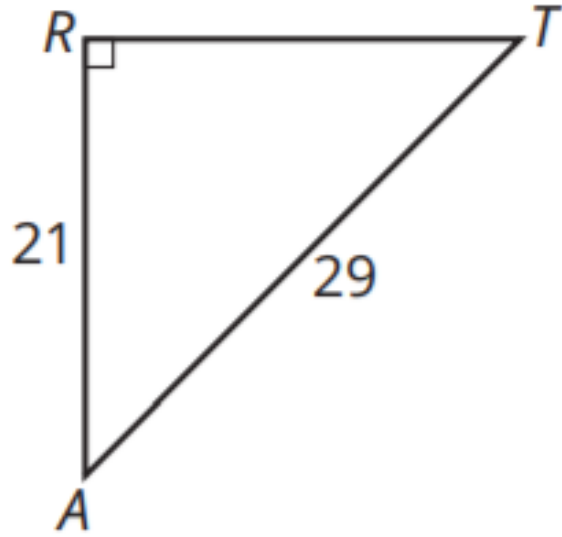


Warm Up

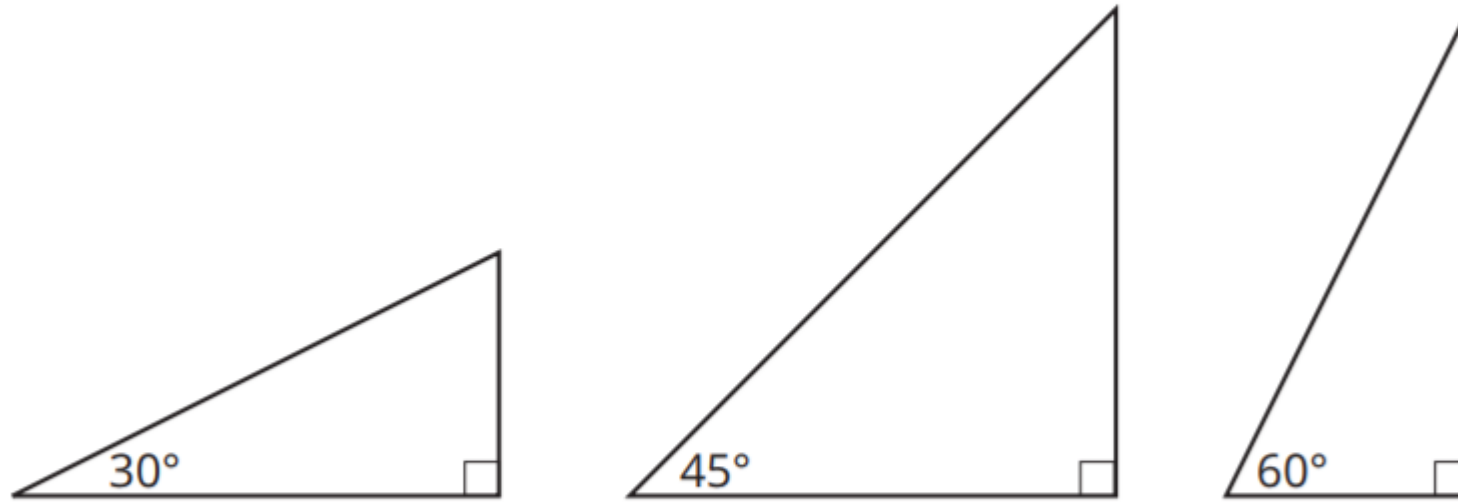


1. Determine the length of \overline{RT} .

Steepness

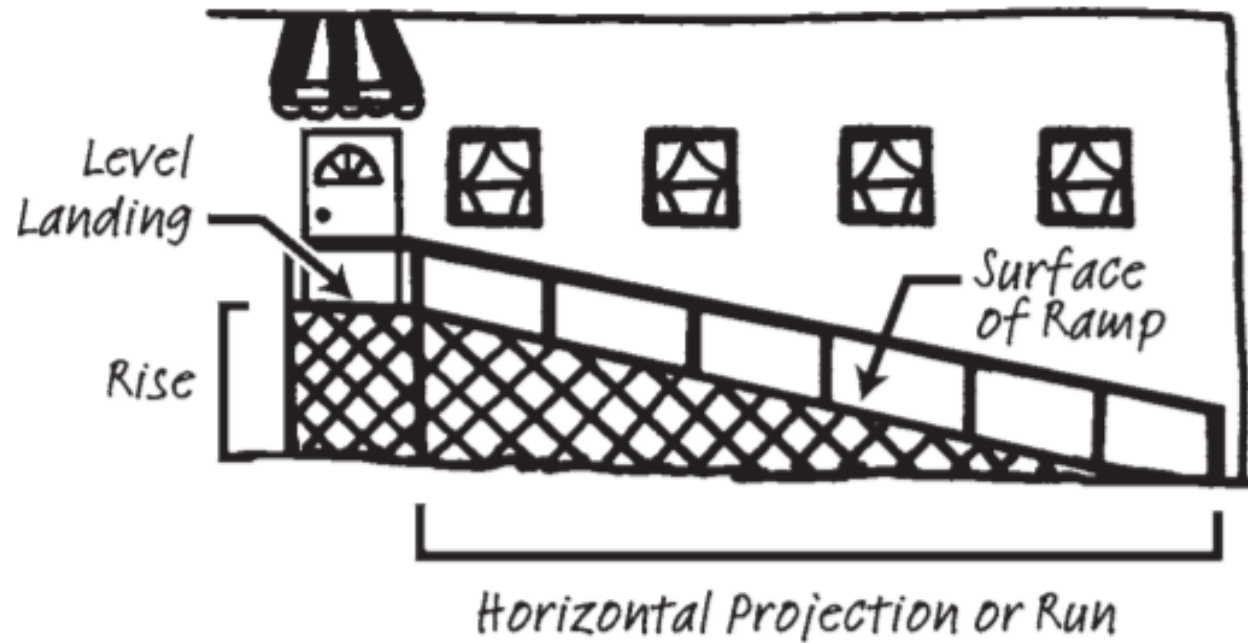
M2-138

Consider the right triangles shown.



1. Describe the steepness of a right triangle in terms of its side lengths.

The maximum incline for a safe wheelchair ramp should not exceed a ratio of 1 : 12. This means that every 1 unit of vertical rise requires 12 units of horizontal run. The maximum rise for any run is 30 inches. The ability to manage the incline of the ramp is related to both its steepness and its length.

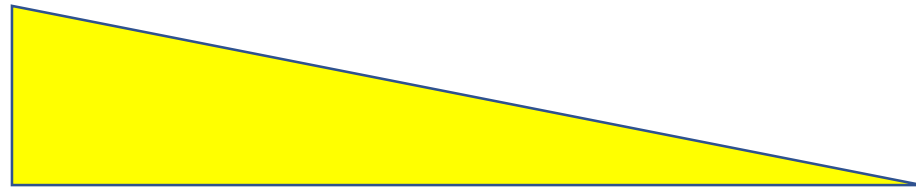


Troy decides to build 2 ramps, each with the ratio 1 : 12.

M2-139

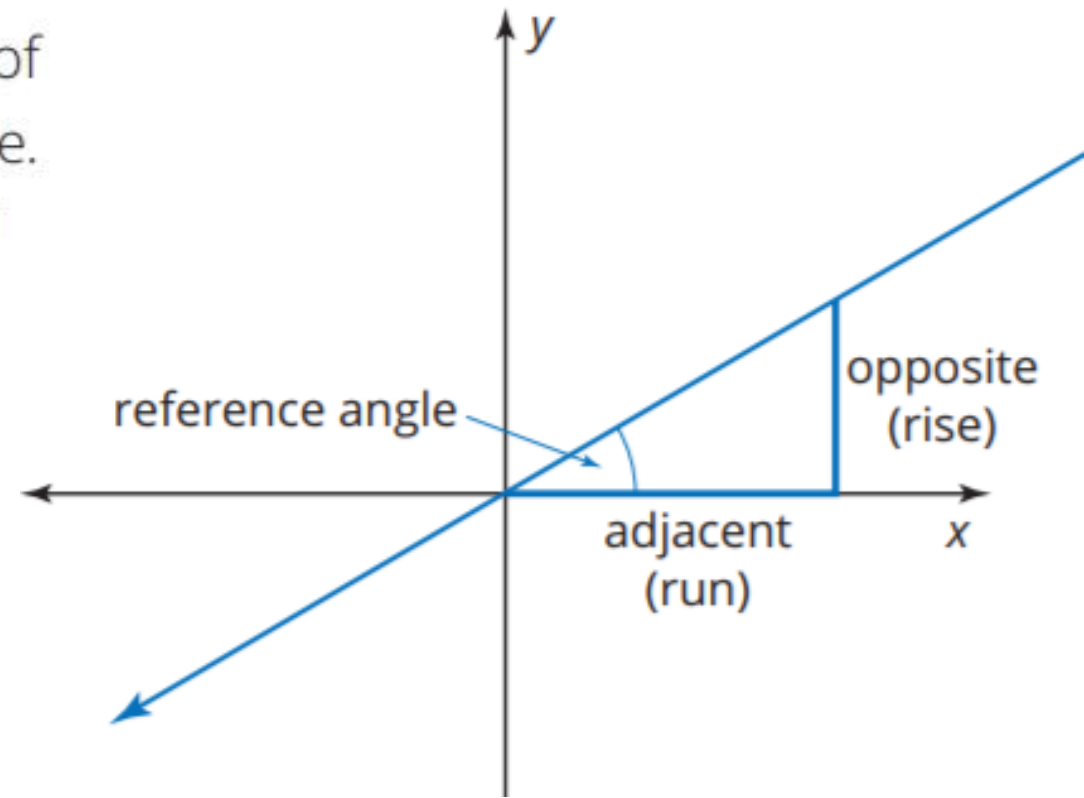
1. The first ramp extends from the front yard to the front porch.
The vertical rise from the yard to the porch is 2.5 feet.

- a. Draw a diagram of the ramp. Include the measurements for the vertical rise and horizontal run of the ramp.



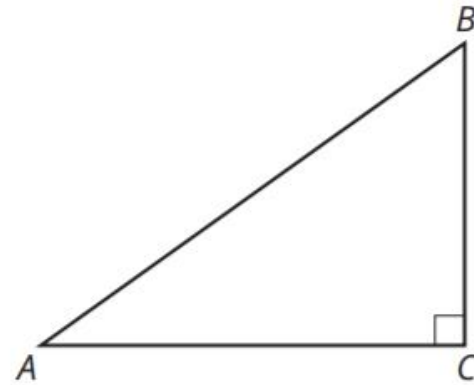
- b. Calculate the length of the surface of the ramp.

The **tangent (tan)** of an acute angle in a right triangle is the ratio of the length of the side that is opposite the reference angle to the length of the side that is adjacent to the reference angle. The expression " $\tan A$ " means "the tangent of $\angle A$." The tangent of an angle can be used to describe the slope of a line.



Consider $\angle A$ in the right triangle shown.

M2-141



The tangent ratio describes the relationship between $\angle A$, the side opposite $\angle A$, and the side adjacent to $\angle A$.

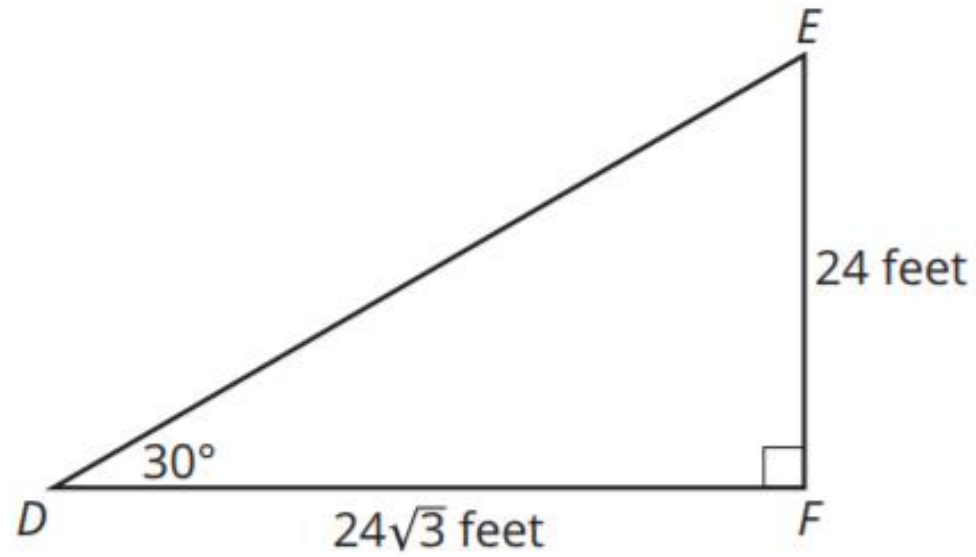
$$\tan A = \frac{\text{length of side opposite } \angle A}{\text{length of side adjacent to } \angle A} = \frac{BC}{AC}$$

6. Use the worked example to complete the ratio that represents the tangent of $\angle B$.

$$\tan B = \frac{\text{length of side opposite } \angle B}{\text{length of side adjacent to } \angle B} = \frac{\boxed{}}{\boxed{}}$$

9. Determine the tangent and cotangent values of both acute angles in $\triangle DEF$. Leave your answers as exact values and rationalize the denominator.

M2-142



1. A proposed wheelchair ramp is shown.

M2-143



- What information about the ramp is required to show that the ramp meets the safety rules?
- Write a decimal that represents the greatest value of the slope of a safe ramp.

2. Two proposed wheelchair ramps are shown. Determine the run of each ramp to meet safety regulations. If necessary, round your answer to the nearest inch.

M2-144

