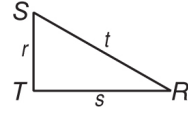


# 8-4 Guided Notes

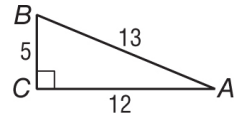
## Trigonometry

**Trigonometric Ratios** The ratio of the lengths of two sides of a right triangle is called a **trigonometric ratio**. The three most common ratios are **sine**, **cosine**, and **tangent**, which are abbreviated *sin*, *cos*, and *tan*, respectively.



$\sin R =$      $\cos R =$      $\tan R =$

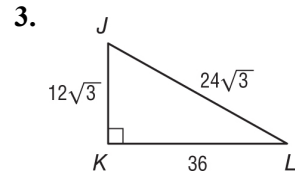
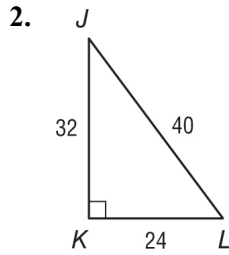
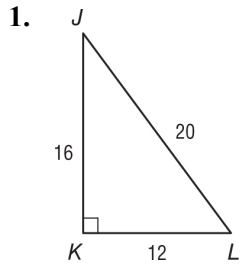
**Example:** Find  $\sin A$ ,  $\cos A$ , and  $\tan A$ . Express each ratio as a fraction and a decimal to the nearest hundredth.



$\sin A =$      $\cos A =$      $\tan A =$

### Exercises

Find  $\sin J$ ,  $\cos J$ ,  $\tan J$ ,  $\sin L$ ,  $\cos L$ , and  $\tan L$ . Express each ratio as a fraction.

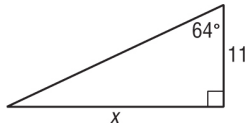


# 8-4 Guided Notes *(continued)*

## Trigonometry

### Finding Side Measures

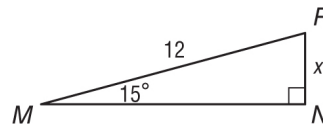
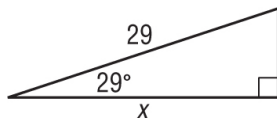
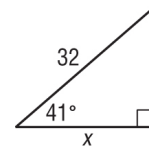
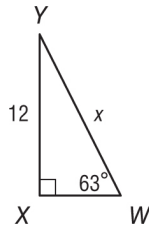
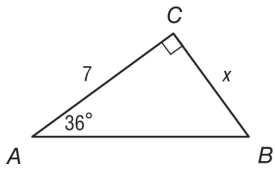
**Example:** Use a calculator to find the length of missing side, round to the tenth decimal place. Set up a trigonometric function and use a proportion to solve for missing side length.



**\*Hint\* When Solving**

If X is on the top THEN \_\_\_\_\_, If X is on the bottom THEN \_\_\_\_\_

### Practice



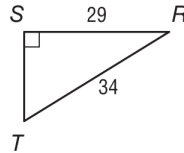
# 8-4 Guided Notes *(continued)*

## Trigonometry

### Finding Angle Measures

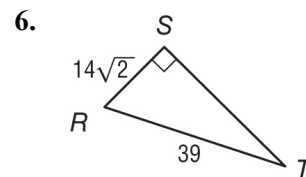
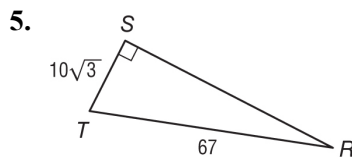
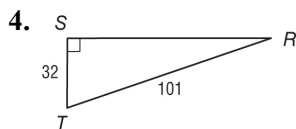
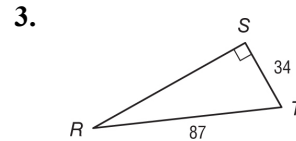
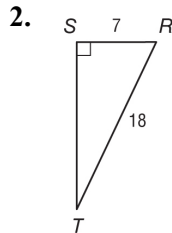
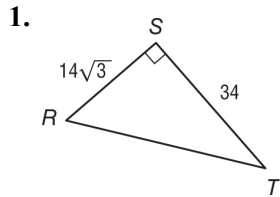
**Example:** Use a calculator to find the measure of  $\angle T$  to the nearest tenth.

The measures given are those of the leg opposite  $\angle T$  and the hypotenuse, so write an equation using the sine ratio.



### Exercises

Use a calculator to find the measure of  $\angle T$  to the nearest tenth.



# 8-4 Guided Notes *(continued)*

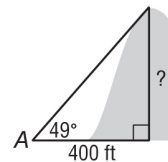
## Trigonometry

### Story Problems

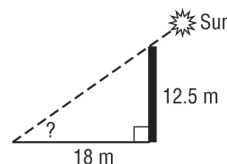
**GEOGRAPHY** Diego used a theodolite to map a region of land for his class in geomorphology. To determine the elevation of a vertical rock formation, he measured the distance from the base of the formation to his position and the angle between the ground and the line of sight to the top of the formation. The distance was 43 meters and the angle was  $36^\circ$ . What is the height of the formation to the nearest meter?

### Exercises

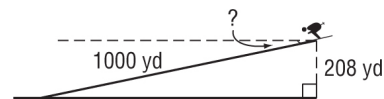
1. **HILL TOP** The angle of elevation from point  $A$  to the top of a hill is  $49^\circ$ . If point  $A$  is 400 feet from the base of the hill, how high is the hill?



2. **SUN** Find the angle of elevation of the Sun when a 12.5-meter-tall telephone pole casts an 18-meter-long shadow.



3. **SKIING** A ski run is 1000 yards long with a vertical drop of 208 yards. Find the angle of depression from the top of the ski run to the bottom.



4. **AIR TRAFFIC** From the top of a 120-foot-high tower, an air traffic controller observes an airplane on the runway at an angle of depression of  $19^\circ$ . How far from the base of the tower is the airplane?

