

8-4 Guided Notes

Trigonometry

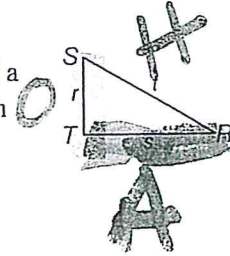
S O C A T O
 h h h a

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.

$$\sin R = \frac{r}{h}$$

$$\cos R = \frac{s}{h}$$

$$\tan R = \frac{r}{s}$$



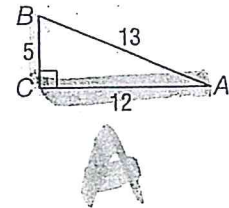
W SIN A
 COS A

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

$$\sin A = \frac{5}{13}$$

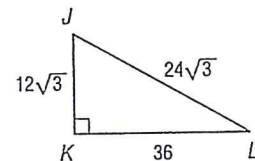
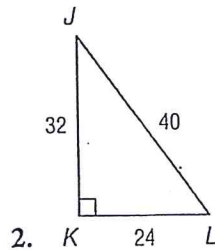
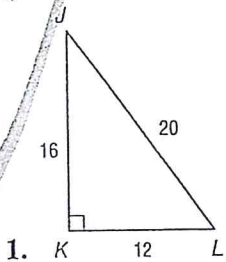
$$\cos A = \frac{12}{13}$$

$$\tan A = \frac{5}{12}$$



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

Trigonometry

SOH CAH TOA
 Glencoe Geometry

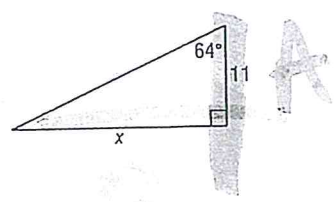
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(continued)

degree

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.



$$\tan 64^\circ = \frac{x}{11}$$

$$11 \cdot 2.05 = \frac{x}{11} \cdot 11$$

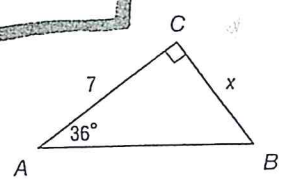
$x = 22.1$

Hint When Solving

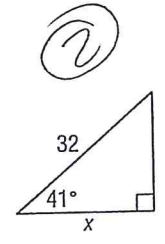
If X is on the top THEN

If X is on the bottom THEN

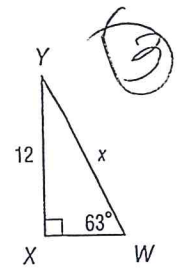
Practice



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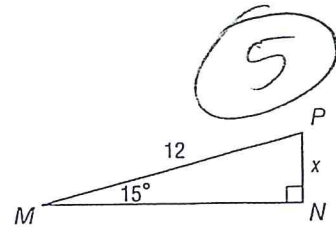
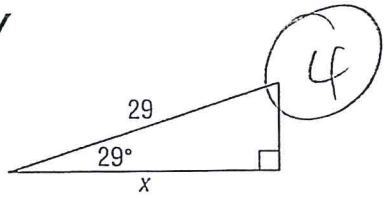
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③

8-4 Guided Notes

Trigonometry



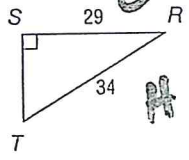
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SOHCAHTOA

Finding Angle Measures

Use inverse

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.



$$\sin T = \frac{29}{34}$$

INV
2nd

sin⁻¹
cos⁻¹
tan⁻¹

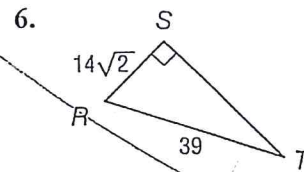
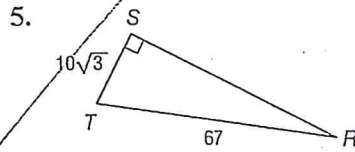
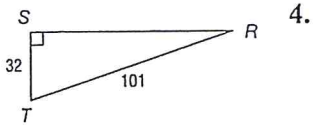
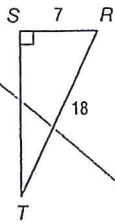
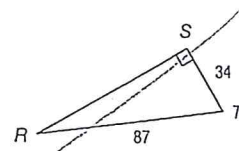
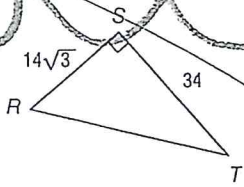
Exercises

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

- 1.
- 2.
- 3.

8-4 Guided Notes

Trigonometry

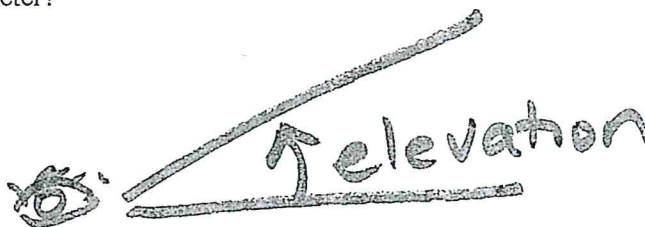
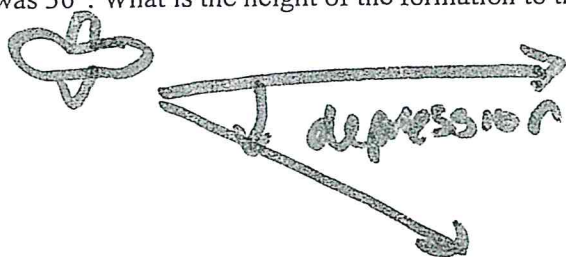


B-4 Guided Notes (continued)

Trigonometry

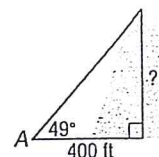
Story Problems

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° . What is the height of the formation to the nearest meter?

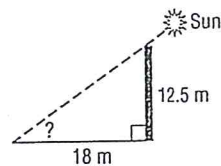


Exercises

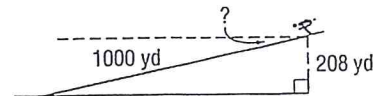
1. **HILL TOP** The angle of elevation from point A to the top of a hill is 49° . If point A is 400 feet from the base of the hill, how high is the hill?



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° . How far from the base of the tower is the airplane?

