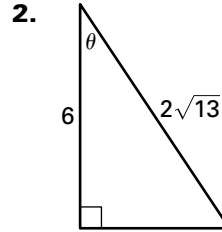
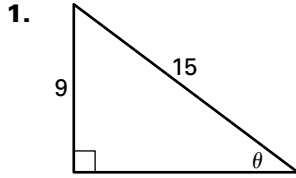


LESSON 9.1

Practice B

For use with the lesson "Use Trigonometry with Right Triangles"

Evaluate the six trigonometric functions of the angle θ .



Let θ be an acute angle of a right triangle. Find the values of the other five trigonometric functions of θ .

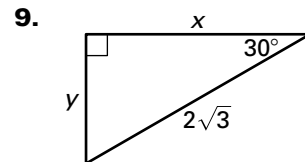
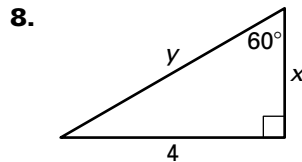
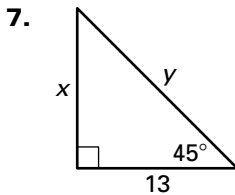
3. $\sin \theta = \frac{4}{5}$

4. $\cos \theta = \frac{5}{6}$

5. $\sec \theta = \frac{\sqrt{73}}{8}$

6. $\cot \theta = \sqrt{3}$

Find the exact values of x and y .

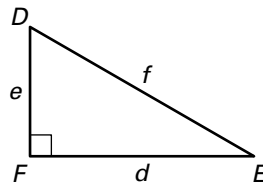


Solve $\triangle DEF$ using the diagram and the given measurements.

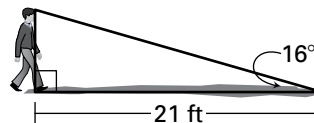
10. $D = 40^\circ, f = 8$

11. $E = 53^\circ, d = 13$

12. $D = 67^\circ, e = 10.5$

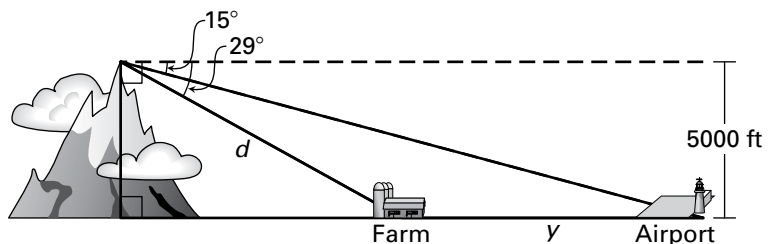


13. **Shadow** A person casts the shadow shown. What is the approximate height of the person?



14. **Mountains** A hiker at the top of a mountain sees a farm and an airport in the distance.

- a. What is the distance d from the hiker to the farm?
- b. What is the distance y from the farm to the airport?



Not drawn to scale

Answers for Chapter 9

Trigonometric Ratios and Functions

Lesson 9.1 Use Trigonometry with Right Triangles

Teaching Guide

1. 180° 2. the side opposite the right angle
3. The sum of the square of the lengths of the legs equals the square of the length of the hypotenuse. 4. 54 5. 20

Investigating Algebra Activity

1.

θ	$\sin \theta$	$\cos \theta$	$\tan \theta$
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$

2. They are equivalent. 3. They are reciprocals.
4. $\cos 60^\circ = \sin 30^\circ$, $\cos 30^\circ = \sin 60^\circ$, and $\cos 45^\circ = \sin 45^\circ$

Practice Level A

1. $\sin \theta = \frac{3}{5}$, $\cos \theta = \frac{4}{5}$, $\tan \theta = \frac{3}{4}$, $\csc \theta = \frac{5}{3}$,
 $\sec \theta = \frac{5}{4}$, $\cot \theta = \frac{4}{3}$ 2. $\sin \theta = \frac{2}{3}$, $\cos \theta = \frac{\sqrt{5}}{3}$,
 $\tan \theta = \frac{2\sqrt{5}}{5}$, $\csc \theta = \frac{3}{2}$, $\sec \theta = \frac{3\sqrt{5}}{5}$, $\cot \theta = \frac{\sqrt{5}}{2}$
3. $\cos \theta = \frac{\sqrt{2}}{2}$, $\tan \theta = 1$, $\csc \theta = \sqrt{2}$,
 $\sec \theta = \sqrt{2}$, $\cot \theta = 1$ 4. $\sin \theta = \frac{2\sqrt{10}}{7}$,
 $\tan \theta = \frac{2\sqrt{10}}{3}$, $\csc \theta = \frac{7\sqrt{10}}{20}$, $\sec \theta = \frac{7}{3}$,
 $\cot \theta = \frac{3\sqrt{10}}{20}$ 5. $\sin \theta = \frac{5\sqrt{89}}{89}$, $\cos \theta = \frac{8\sqrt{89}}{89}$,
 $\sec \theta = \frac{\sqrt{89}}{8}$, $\csc \theta = \frac{\sqrt{89}}{5}$, $\cot \theta = \frac{8}{5}$
6. $\sin \theta = \frac{2\sqrt{5}}{5}$, $\cos \theta = \frac{\sqrt{5}}{5}$, $\tan \theta = 2$,
 $\csc \theta = \frac{\sqrt{5}}{2}$, $\cot \theta = \frac{1}{2}$ 7. $x = 5$, $y = 5\sqrt{2}$
8. $x = 3$, $y = 6$ 9. $x = 4\sqrt{3}$, $y = 4$
10. $A = 55^\circ$, $a \approx 8.19$, $b \approx 5.74$
11. $A = 42^\circ$, $b \approx 8.88$, $c \approx 11.96$
12. $B = 38^\circ$, $a \approx 8.96$, $c \approx 11.37$
13. about 15 ft 14. 24 ft

Practice Level B

1. $\sin \theta = \frac{3}{5}$, $\cos \theta = \frac{4}{5}$, $\tan \theta = \frac{3}{4}$, $\csc \theta = \frac{5}{3}$,
 $\sec \theta = \frac{5}{4}$, $\cot \theta = \frac{4}{3}$ 2. $\sin \theta = \frac{2\sqrt{13}}{13}$,
 $\cos \theta = \frac{3\sqrt{13}}{13}$, $\tan \theta = \frac{2}{3}$, $\csc \theta = \frac{\sqrt{13}}{2}$,
 $\sec \theta = \frac{\sqrt{13}}{3}$, $\cot \theta = \frac{3}{2}$ 3. $\cos \theta = \frac{3}{5}$,
 $\tan \theta = \frac{4}{3}$, $\csc \theta = \frac{5}{4}$, $\sec \theta = \frac{5}{3}$, $\cot \theta = \frac{3}{4}$
4. $\sin \theta = \frac{\sqrt{11}}{6}$, $\tan \theta = \frac{\sqrt{11}}{5}$, $\csc \theta = \frac{6\sqrt{11}}{11}$,
 $\sec \theta = \frac{6}{5}$, $\cot \theta = \frac{5\sqrt{11}}{11}$ 5. $\sin \theta = \frac{3\sqrt{73}}{73}$,
 $\cos \theta = \frac{8\sqrt{73}}{73}$, $\tan \theta = \frac{3}{8}$, $\csc \theta = \frac{\sqrt{73}}{3}$, $\cot \theta = \frac{8}{3}$
6. $\sin \theta = \frac{1}{2}$, $\cos \theta = \frac{\sqrt{3}}{2}$, $\tan \theta = \frac{\sqrt{3}}{3}$,
 $\csc \theta = 2$, $\sec \theta = \frac{2\sqrt{3}}{3}$ 7. $x = 13$, $y = 13\sqrt{2}$
8. $x = \frac{4\sqrt{3}}{3}$, $y = \frac{8\sqrt{3}}{3}$ 9. $x = 3$, $y = \sqrt{3}$
10. $E = 50^\circ$, $d \approx 5.14$, $e \approx 6.13$ 11. $D = 37^\circ$,
 $e \approx 17.25$, $f \approx 21.60$ 12. $E = 23^\circ$, $d \approx 24.74$,
 $f \approx 26.87$ 13. about 6 ft 14. a. about 10,313 ft
b. about 9640 ft
- ### Practice Level C
1. $\sin \theta = \frac{9\sqrt{202}}{202}$, $\cos \theta = \frac{11\sqrt{202}}{202}$, $\tan \theta = \frac{9}{11}$,
 $\csc \theta = \frac{\sqrt{202}}{9}$, $\sec \theta = \frac{\sqrt{202}}{11}$, $\cot \theta = \frac{11}{9}$
2. $\sin \theta = \frac{2\sqrt{7}}{7}$, $\cos \theta = \frac{\sqrt{21}}{7}$, $\tan \theta = \frac{2\sqrt{3}}{3}$,
 $\csc \theta = \frac{\sqrt{7}}{2}$, $\sec \theta = \frac{\sqrt{21}}{3}$, $\cot \theta = \frac{\sqrt{3}}{2}$
3. $\cos \theta = \frac{\sqrt{14}}{4}$, $\tan \theta = \frac{\sqrt{7}}{7}$, $\csc \theta = 2\sqrt{2}$,
 $\sec \theta = \frac{2\sqrt{14}}{7}$, $\cot \theta = \sqrt{7}$ 4. $\sin \theta = \frac{\sqrt{11}}{4}$,
 $\tan \theta = \frac{\sqrt{55}}{5}$, $\csc \theta = \frac{4\sqrt{11}}{11}$, $\sec \theta = \frac{4\sqrt{5}}{5}$,
 $\cot \theta = \frac{\sqrt{55}}{11}$ 5. $\sin \theta = \frac{\sqrt{37}}{37}$, $\cos \theta = \frac{6\sqrt{37}}{37}$,
 $\csc \theta = \sqrt{37}$, $\sec \theta = \frac{\sqrt{37}}{6}$, $\cot \theta = 6$
6. $\sin \theta = \frac{5}{14}$, $\cos \theta = \frac{3\sqrt{19}}{14}$, $\tan \theta = \frac{5\sqrt{19}}{57}$,
 $\sec \theta = \frac{14\sqrt{19}}{57}$, $\cot \theta = \frac{3\sqrt{19}}{5}$