7.7 SOLVING RIGHT TRIANGLES

TO **SOLVE A RIGHT TRIANGLE** MEANS TO FIND THE MEASURES OF ALL OF ITS SIDES AND ANGLES. YOU CAN SOLVE A RIGHT TRIANGLE IF YOU KNOW EITHER OF THE FOLLOWING:

1) TWO SIDES LENGTHS

2) ONE SIDE LENGTH AND THE MEASURE OF ONE ACUTE ANGLE

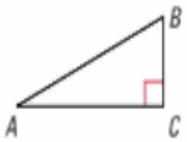
READ VOCABULARY

The expression "$\tan^{-1} x$" is read as "the inverse tangent of x."

KEY CONCEPT — *For Your Notebook*

Inverse Trigonometric Ratios

Let $\angle A$ be an acute angle.



Inverse Tangent If $\tan A = x$, then $\tan^{-1} x = m\angle A$. $\tan^{-1} \frac{BC}{AC} = m\angle A$

Inverse Sine If $\sin A = y$, then $\sin^{-1} y = m\angle A$. $\sin^{-1} \frac{BC}{AB} = m\angle A$

Inverse Cosine If $\cos A = z$, then $\cos^{-1} z = m\angle A$. $\cos^{-1} \frac{AC}{AB} = m\angle A$

USE A CALCULATOR TO FIND THE MEASURE OF EACH ANGLE TO THE NEAREST TENTH OF A DEGREE.

1) SIN A = 7/12

$2^{nd}\ \sin(7 \div 12) =$

$m\angle A = 35.7^\circ$

2) COS A = 0.3867

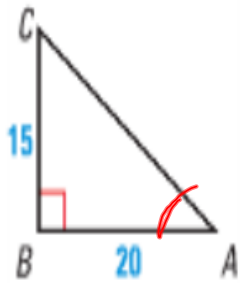
$m\angle A \approx 67.3^\circ$

3) TAN B = 12/18

$m\angle B \approx 33.7^\circ$

EXAMPLE 1 Use an inverse tangent to find an angle measure

Use a calculator to approximate the measure of $\angle A$ to the nearest tenth of a degree.

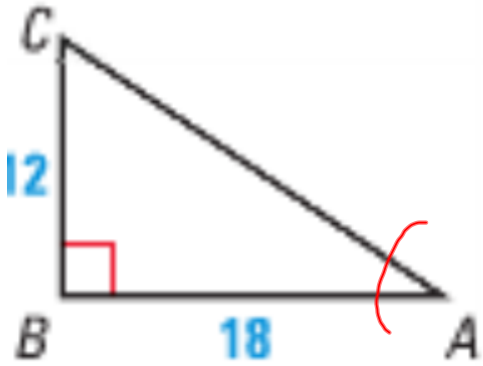


Solution

$$\tan A = \frac{15}{20}$$

$$2^{nd}\ \tan(15 \div 20)^{\circ}$$

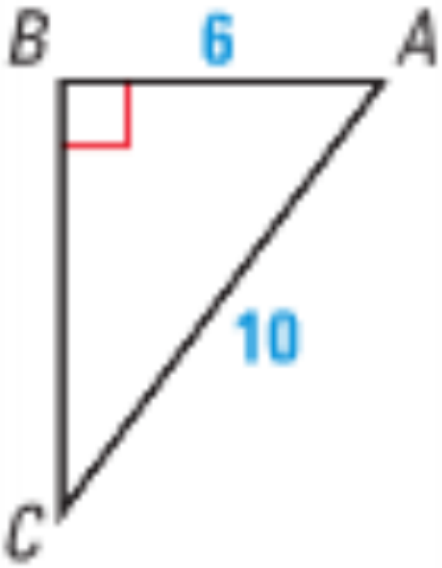
$$m\angle A \approx 36.9^{\circ}$$



$$\tan A = \frac{12}{18}$$

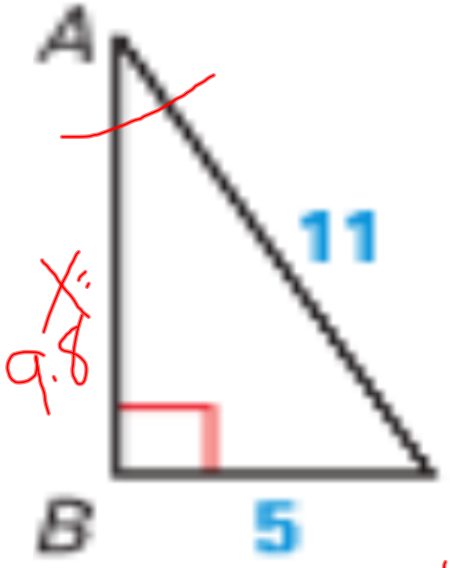
$$m\angle A \approx 33.7^\circ$$

7.



$\cos A = \frac{6}{10}$

$m\angle A = 53.1^{\circ}$



$X = 9.8$

$m\angle A =$

$m\angle C =$

$11^2 = 5^2 + x^2$

$121 = 25 + x^2$

$96 = x^2$

$x = \sqrt{96} \approx 9.8$

$\cos A = \frac{9.8}{11}$

$m\angle A \approx 27^\circ$

$\angle A + \angle C = 90^\circ$

$m\angle C =$

90

-27

63°

ID: 1

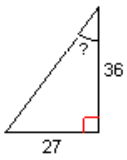
Geometry Name_____

Assignment

Date_____ Period____

Find the measure of the indicated angle to the nearest degree.

1)



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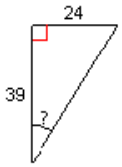

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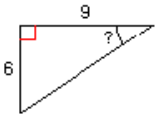

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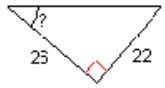

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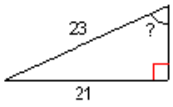

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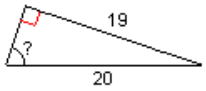

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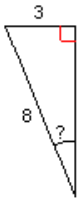

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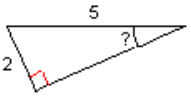

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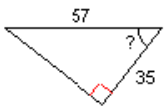

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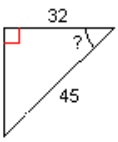

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Answers to Assignment (ID: 1)

1) 37°	2) 32°	3) 34°	4) 40°
5) 66°	6) 72°	7) 22°	8) 24°
9) 52°	10) 45°		

Name _____ Date _____

LESSON 7.7

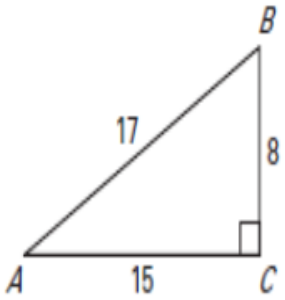
Practice A

For use with pages 483–489

Match the trigonometric expression with the correct ratio. Some ratios may be used more than once, and some may not be used at all.

1. $\sin A$ **2.** $\cos A$ **3.** $\tan A$

4. $\sin B$ **5.** $\cos B$ **6.** $\tan B$

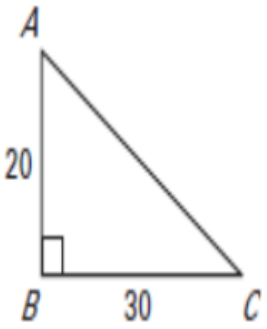


A. $\frac{8}{17}$ **B.** $\frac{15}{17}$ **C.** $\frac{17}{8}$

D. $\frac{17}{15}$ **E.** $\frac{8}{15}$ **F.** $\frac{15}{8}$

Use a calculator to approximate the measure of $\angle A$ to the nearest tenth of a degree.

7.



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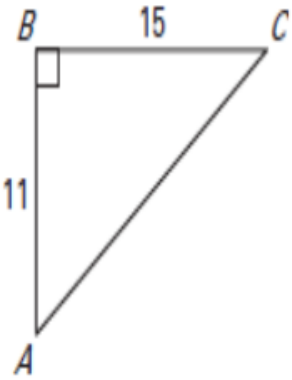

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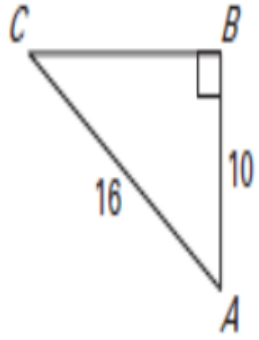

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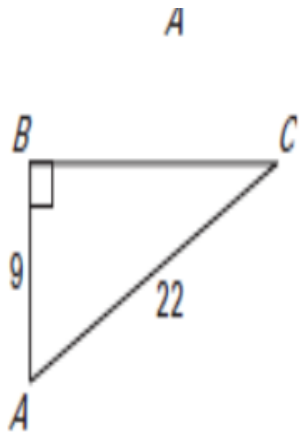

Solve the right triangle. Round decimal answers to the nearest tenth.

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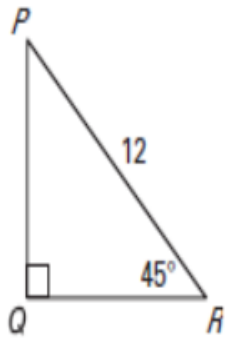

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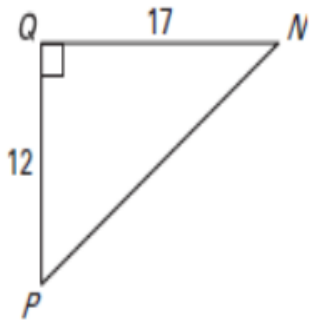

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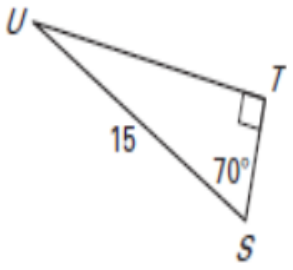

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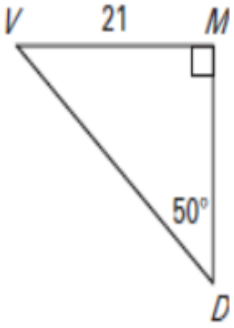

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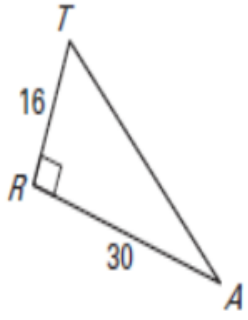

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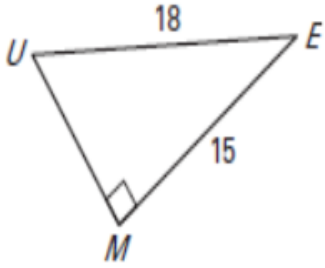


LESSON 7.7

Practice A *continued*

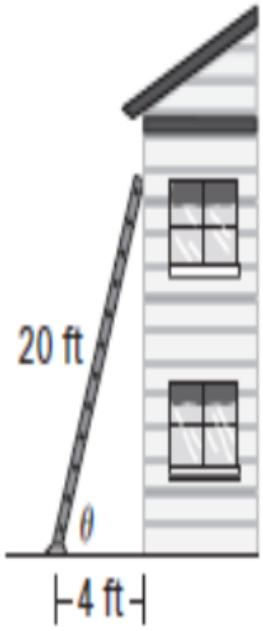
For use with pages 483–489

Let $\angle A$ be an acute angle in a right triangle. Approximate the measure of $\angle A$ to the nearest tenth of a degree.

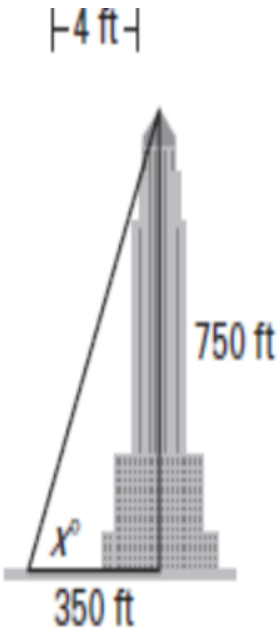
19. $\sin A = 0.45$ **20.** $\tan A = 0.9$ **21.** $\sin A = 0.76$ **22.** $\cos A = 0.32$

23. $\tan A = 5.2$ **24.** $\cos A = 0.24$ **25.** $\sin A = 0.15$ **26.** $\cos A = 0.66$

28. Ladder You lean a 20 foot ladder against a wall. The base of the ladder is 4 feet from the wall. What angle θ does the ladder make with the ground?



29. **Skyscraper** You are standing 350 feet away from a skyscraper that is 750 feet tall. What is the angle of elevation from you to the top of the building?



30. Concert You attend a music concert with some friends and sit halfway up the bleachers in the arena. The angle of depression from your horizontal line of sight to the stage is 24°. If your seat is 45 feet above stage level, what is your actual distance d from the stage? Round to the nearest foot.