5-1

Practice

Angles and Degree Measure

Change each measure to degrees, minutes, and seconds.

1. 28.955°

2. −57.327°

Write each measure as a decimal degree to the nearest thousandth.

3. 32° 28′ 10″

4. −73° 14′ 35″

Give the angle measure represented by each rotation.

5. 1.5 rotations clockwise

6. 2.6 rotations counterclockwise

Identify all angles that are coterminal with each angle. Then find one positive angle and one negative angle that are coterminal with each angle.

7. 43°

8. −30°

If each angle is in standard position, determine a coterminal angle that is between 0° and 360°, and state the quadrant in which the terminal side lies.

9. 472°

10. −995°

Find the measure of the reference angle for each angle.

11. 227°

12. 640°

13. ***Navigation*** For an upcoming trip, Jackie plans to sail from Santa Barbara Island, located at 33° 28′ 32″ N, 119° 2′ 7″ W, to Santa Catalina Island, located at 33.386° N, 118.430° W. Write the latitude and longitude for Santa Barbara Island as decimals to the nearest thousandth and the latitude and longitude for Santa Catalina Island as degrees, minutes, and seconds.

NAME _____ DATE _____ PERIOD _____

5-1

Practice

Angles and Degree Measure

Change each measure to degrees, minutes, and seconds.

1. 28.955°
28° 57′ 18″

2. −57.327°
−57° 19′ 37.2″

Write each measure as a decimal degree to the nearest thousandth.

3. 32° 28′ 10″
32.469°

4. −73° 14′ 35″
−73.243°

Give the angle measure represented by each rotation.

5. 1.5 rotations clockwise
−540°

6. 2.6 rotations counterclockwise
936°

Identify all angles that are coterminal with each angle. Then find one positive angle and one negative angle that are coterminal with each angle.

7. 43°
43° + 360*k*°; sample answers: 763°; −317°

8. −30°
−30° + 360*k*°; sample answers: 690°; −750°

If each angle is in standard position, determine a coterminal angle that is between 0° and 360°, and state the quadrant in which the terminal side lies.

9. 472°
112°; II

10. −995°
85°; I

Find the measure of the reference angle for each angle.

11. 227°
47°

12. 640°
80°

13. ***Navigation*** For an upcoming trip, Jackie plans to sail from Santa Barbara Island, located at 33° 28′ 32″ N, 119° 2′ 7″ W, to Santa Catalina Island, located at 33.386° N, 118.430° W. Write the latitude and longitude for Santa Barbara Island as decimals to the nearest thousandth and the latitude and longitude for Santa Catalina Island as degrees, minutes, and seconds.
Santa Barbara Island: 33.476° N, 119.035° W
Santa Catalina Island: 33° 23′ 9.6″ N, 118° 25′ 48″ W

NAME _____ DATE _____ PERIOD _____

5-1

Enrichment

Reading Mathematics: If and Only If Statements

If p and q are interchanged in a conditional statement so that p becomes the conclusion and q becomes the hypothesis, the new statement, $q \rightarrow p$, is called the **converse** of $p \rightarrow q$.

If $p \rightarrow q$ is true, $q \rightarrow p$ may be either true or false.

Example **Find the converse of each conditional.**

a. $p \rightarrow q$: **All squares are rectangles.** (true)
$q \rightarrow p$: All rectangles are squares. (false)

b. $p \rightarrow q$: **If a function $f(x)$ is increasing on an interval I, then for every a and b contained in I, $f(a) < f(b)$ whenever $a < b$.** (true)
$q \rightarrow p$: If for every a and b contained in an interval I, $f(a) < f(b)$ whenever $a < b$ then function $f(x)$ is increasing on I. (true)

In Lesson 3-5, you saw that the two statements in Example 2 can be combined in a single statement using the words "if and only if."

> A function $f(x)$ is increasing on an interval I *if and only if* for every a and b contained in I, $f(a) < f(b)$ whenever $a < b$.

The statement "p if and only if q" means that p implies q and q implies p.

State the converse of each conditional. Then tell if the converse is true or false. If it is true, combine the statement and its converse into a single statement using the words "if and only if."

1. All integers are rational numbers.
All rational numbers are integers; false

2. If for all x in the domain of a function $f(x)$, $f(-x) = -f(x)$, then the graph of $f(x)$ is symmetric with respect to the origin.
If a function has a graph that is symmetric with respect to the origin, then $f(-x) = -f(x)$ for all x in the domain of $f(x)$; true. A function has a graph that is symmetric with respect to the origin if and only if $f(-x) = -f(x)$ for all x in the domain of $f(x)$.

3. If $f(x)$ and $f^{-1}(x)$ are inverse functions, then $[f \circ f^{-1}](x) = [f^{-1} \circ f](x) = x$.
If $[f \circ f^{-1}](x) = [f^{-1} \circ f](x) = x$, then $f(x)$ and $f^{-1}(x)$ are inverse functions; true. Two functions, $f(x)$ and $f^{-1}(x)$, are inverse functions if and only if $[f \circ f^{-1}](x) = [f^{-1} \circ f](x) = x$.