Name: ________________________ **Class:** ___________________ **Date:** __________ **ID: A**

Algebra II Practice Test - 13

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ **1.** (1 point) Find the measures of a positive angle and a negative angle that are coterminal with $-258°$.

A) $-168°$ and $-348°$
B) $-78°$ and $-438°$
C) $618°$ and $258°$
D) $102°$ and $-618°$

____ **2.** (1 point) Solve the equation $\sin\theta = 0.3$ to the nearest tenth. Use the restrictions $90° < \theta < 180°$.

A) $\theta = 17.5°$
B) $\theta = 107.5°$
C) $\theta = 162.5°$
D) $\theta = 197.5°$

____ **3.** (1 point) You can use trigonometry to measure the height of a pyramid in Egypt.

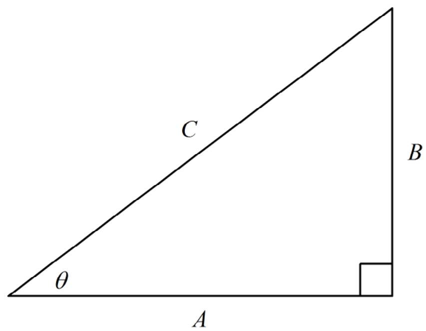
[1.] An archaeologist positions himself 260 ft from the base of a pyramid so that his eye level is 5 ft above the ground. If the pyramid is 500 feet in height, what would be the angle of elevation from the archaeologist to the top of the pyramid?

[2.] The angle of elevation from the eye level of an archaeologist to the top of a pyramid whose base is 400 feet away is 50°. To the nearest foot, what is the height of the pyramid?

A) [1.] $\theta \approx 62°$
[2.] $h \approx 482$ ft
B) [1.] $\theta \approx 63°$
[2.] $h \approx 477$ ft
C) [1.] $\theta \approx 62°$
[2.] $h \approx 336$ ft
D) [1.] $\theta \approx 63°$
[2.] $h \approx 341$ ft

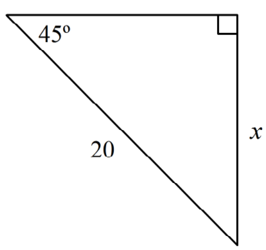
Name: ________________________ ID: A

____ **4.** (5 points) Find the value of the sine, cosine, and tangent functions for θ where $A = 144$, $B = 108$, and $C = 180$.



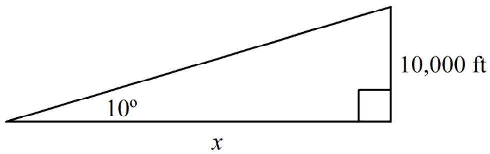
A) $\sin\theta = \frac{4}{5}$; $\cos\theta = \frac{3}{5}$; $\tan\theta = \frac{4}{3}$
B) $\sin\theta = \frac{3}{5}$; $\cos\theta = \frac{4}{5}$; $\tan\theta = \frac{4}{3}$
C) $\sin\theta = \frac{3}{5}$; $\cos\theta = \frac{4}{5}$; $\tan\theta = \frac{3}{4}$
D) $\sin\theta = \frac{4}{5}$; $\cos\theta = \frac{3}{5}$; $\tan\theta = \frac{3}{4}$

____ **5.** (5 points) Use a trigonometric function to find the value of x.



A) $x = 20\sqrt{3}$
B) $x = 45\sqrt{3}$
C) $x = 10\sqrt{2}$
D) $x = 20\sqrt{2}$

____ **6.** (5 points) After takeoff from an airport, an airplane's angle of ascent is 10°. The airplane climbs to an altitude of 10,000 feet. At that point, what is the land distance between the airplane and the airport? Round your answer to the nearest foot.

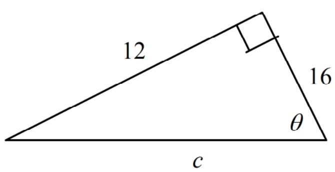


A) 1,763 ft
B) 57,588 ft
C) 56,713 ft
D) 15,424 ft

____ **7.** (5 points) A surveyor whose eye level is 5 feet above the ground determines the angle of elevation to the top of an office building to be 41.7°. If the surveyor is standing 40 feet from the base of the building, what is the height of the building to the nearest foot?

A) 41 ft
B) 50 ft
C) 32 ft
D) 36 ft

____ **8.** (5 points) Find the values of the six trigonometric functions for θ.



A) $\sin\theta = \frac{4}{5}$; $\cos\theta = \frac{3}{5}$; $\tan\theta = \frac{4}{3}$; $\csc\theta = \frac{5}{4}$; $\sec\theta = \frac{5}{3}$; $\cot\theta = \frac{3}{4}$

B) $\sin\theta = \frac{4}{7}$; $\cos\theta = \frac{3}{7}$; $\tan\theta = \frac{4}{3}$; $\csc\theta = \frac{7}{4}$; $\sec\theta = \frac{7}{3}$; $\cot\theta = \frac{3}{4}$

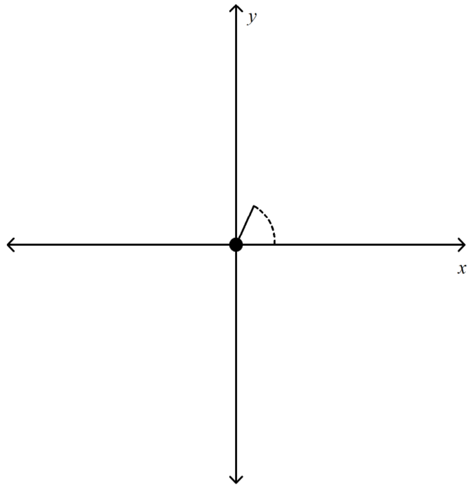
C) $\sin\theta = \frac{3}{7}$; $\cos\theta = \frac{4}{7}$; $\tan\theta = \frac{3}{4}$; $\csc\theta = \frac{7}{3}$; $\sec\theta = \frac{7}{4}$; $\cot\theta = \frac{4}{3}$

D) $\sin\theta = \frac{3}{5}$; $\cos\theta = \frac{4}{5}$; $\tan\theta = \frac{3}{4}$; $\csc\theta = \frac{5}{3}$; $\sec\theta = \frac{5}{4}$; $\cot\theta = \frac{4}{3}$

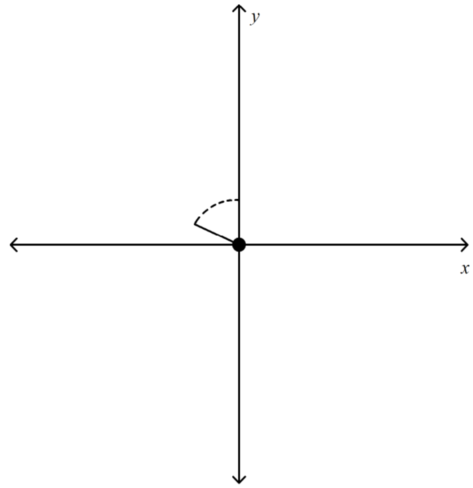
Name: ________________________ **ID: A**

____ **9.** (5 points) Draw an angle with 65° in standard position.

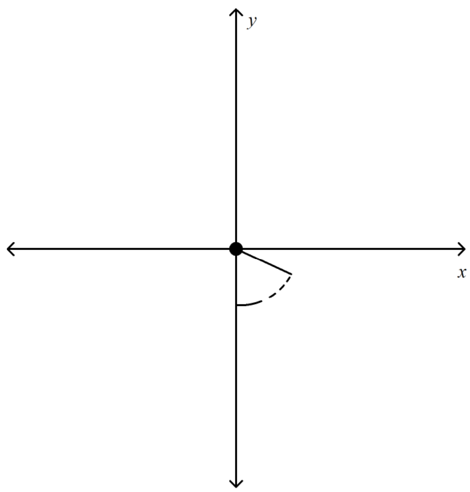
A)



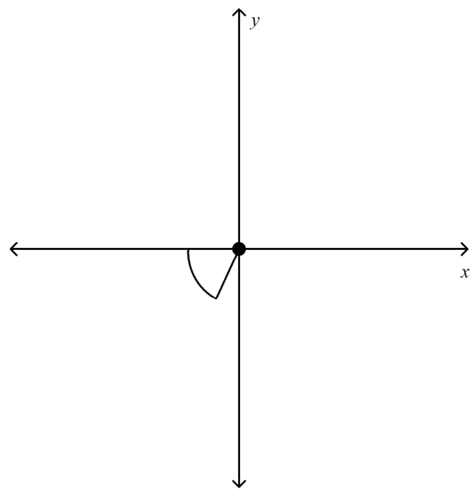
C)



B)



D)



____ **10.** (5 points) Find the measure of the reference angle for $\theta = -150°$.

A) –30°
B) 30°
C) 210°
D) 120°

____ **11.** (5 points) $P(-7,-2)$ is a point on the terminal side of θ in standard position. Find the exact value of the six trigonometric functions for θ.

A) $\sin\theta = -\frac{2\sqrt{53}}{53}$; $\csc\theta = -\frac{\sqrt{53}}{2}$;
$\cos\theta = -\frac{7\sqrt{53}}{53}$; $\sec\theta = -\frac{\sqrt{53}}{7}$;
$\tan\theta = \frac{2}{7}$; $\cot\theta = \frac{7}{2}$

B) $\sin\theta = -\frac{\sqrt{53}}{7}$; $\csc\theta = -\frac{7\sqrt{53}}{53}$;
$\cos\theta = -\frac{\sqrt{53}}{2}$; $\sec\theta = -\frac{2\sqrt{53}}{53}$;
$\tan\theta = \frac{2}{7}$; $\cot\theta = \frac{7}{2}$

C) $\sin\theta = \frac{\sqrt{53}}{7}$; $\csc\theta = \frac{7\sqrt{53}}{53}$;
$\cos\theta = \frac{\sqrt{53}}{2}$; $\sec\theta = \frac{2\sqrt{53}}{53}$;
$\tan\theta = \frac{2}{7}$; $\cot\theta = \frac{7}{2}$

D) $\sin\theta = -\frac{7\sqrt{53}}{53}$; $\csc\theta = -\frac{\sqrt{53}}{7}$;
$\cos\theta = -\frac{2\sqrt{53}}{53}$; $\sec\theta = -\frac{\sqrt{53}}{2}$;
$\tan\theta = \frac{7}{2}$; $\cot\theta = \frac{2}{7}$

____ **12.** (5 points) Write an expression that can be used to determine all of the coterminal angles of an angle that measures 160°.

A) $(160°)n$, where n is an integer
B) $160° + (90)n$, where n is an integer
C) $160° + (180°)n$, where n is an integer
D) $160° + (360°)n$, where n is an integer

____ **13.** (5 points) Convert $\frac{16\pi}{9}$ from radians to degrees.

A) 320º
B) 350º
C) 300º
D) 280º

____ **14.** (5 points) Use the unit circle to find the exact value of the trigonometric function cos 210°.

A) $-\frac{\sqrt{3}}{2}$
B) $-\frac{1}{2}$
C) $\frac{\sqrt{2}}{2}$
D) -1

____ **15.** (5 points) Use a reference angle to find the value of cos 30º.

A) $-\frac{\sqrt{3}}{2}$
B) $\frac{\sqrt{3}}{2}$
C) $\frac{1}{2}$
D) $\sqrt{3}$

____ **16.** (5 points) A bicycle tire with a diameter of 26 inches makes 3 revolutions per second. To the nearest mile, how far does a point on the edge of the tire travel in one hour? (Hint: Find how far the bicycle travels in one hour.)

A) 4 miles
B) 6 miles
C) 14 miles
D) 28 miles

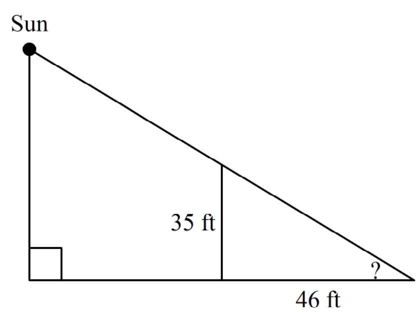
____ **17.** (5 points) Find all possible values of $\sin^{-1}\dfrac{\sqrt{3}}{2}$.

A) $\dfrac{\pi}{3}+(2\pi)n, \dfrac{2\pi}{3}+(2\pi)n$
B) 0.0151
C) $\dfrac{\pi}{6}+(2\pi)n, \dfrac{5\pi}{6}+(2\pi)n$
D) $\dfrac{\pi}{4}+(2\pi)n, \dfrac{3\pi}{4}+(2\pi)n$

____ **18.** (5 points) Evaluate the inverse trigonometric function $\mathrm{Sin}^{-1}(-1)$. Give your answer in both radians and degrees.

A) $\mathrm{Sin}^{-1}(-1)=\dfrac{3\pi}{2}$ or 270°
B) $\mathrm{Sin}^{-1}(-1)=-\dfrac{\pi}{2}$ or −90°
C) $\mathrm{Sin}^{-1}(-1)=\pi$ or 180°
D) $\mathrm{Sin}^{-1}(-1)=-\pi$ or −180°

____ **19.** (5 points) A 35-foot telephone pole casts a 46-foot shadow on the ground while the sun is shining. To the nearest degree, what is the angle of elevation of the sun from the end of the shadow?

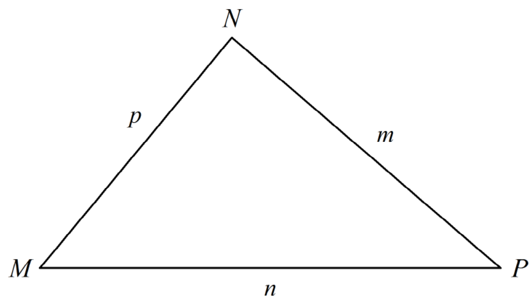


A) 37°
B) 50°
C) 40°
D) 53°

____ **20.** (5 points) A triangle has a side with length 7 feet and another side with length 7 feet. The angle between the sides measures 73°. Find the area of the triangle. Round your answer to the nearest tenth.

A) 7.2 ft^2
B) 46.9 ft^2
C) 23.4 ft^2
D) 1788.5 ft^2

____ **21.** (5 points) Solve the triangle. $m\angle N = 121°$, $m\angle P = 33°$, and $m = 12$. Round to the nearest tenth.



A) $m\angle M = 26°$, $n \approx 23.5$, $p \approx 9.7$
B) $m\angle M = 26°$, $n \approx 6.1$, $p \approx 9.7$
C) $m\angle M = 26°$, $n \approx 6.1$, $p \approx 14.9$
D) $m\angle M = 26°$, $n \approx 23.5$, $p \approx 14.9$

____ **22.** (5 points) Two airplanes leave the airport at the same time. One airplane flies due east at a speed of 300 miles per hour. The other airplane flies east-northeast at a speed of 350 miles per hour (the angle between the two directions is 22.5º). If the planes are at the same altitude, how far apart are they after 2 hours? Round your answer to the nearest mile.

A) 272 miles
B) 136 miles
C) 100 miles
D) 727 miles

____ **23.** (5 points) A building has a triangular floor with sides of 150, 200, and 280 feet. To the nearest square foot, what is the area of the floor of the building?

A) 14,464 ft^2
B) 213,334 ft^2
C) 315 ft^2
D) 2,898 ft^2

Algebra II Practice Test - 13
Answer Section

MULTIPLE CHOICE

1. D

Add 360° to find one coterminal angle.
$-258° + 360° = 102°$

Subtract 360° to another coterminal angle.
$-258° - 360° = -618°$

There are an infinite number of angles that are coterminal with −258°. You can find them by adding or subtracting other integer multiples of 360°.

	Feedback
A	Add or subtract a multiple of 360 to find a coterminal angle.
B	Add or subtract a multiple of 360 to find a coterminal angle.
C	Add or subtract a multiple of 360 to find a coterminal angle.
D	Correct!

2. C

Using the inverse sine function we get $\theta = \sin^{-1}(0.3) \approx 17.5°$.

Because $90° < \theta < 180°$ we need to find the angle in Quadrant II that has the same sine value as 17.5°.

$\theta \approx 180° - 17.5° = 162.5°$

	Feedback
A	Check the range given in the problem.
B	Find the reference angle from the x-axis.
C	Correct!
D	Check the range given in the problem.

3. A

[1.] The angle of elevation, θ, may be found using the tangent function, $\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}}$.

The opposite side is the distance from eye level to the top of the pyramid, or 495 feet.
The adjacent side is the distance from the archaeologist to the base of the pyramid, or 260 ft.

$$\tan\theta = \frac{495}{260}$$

$$\theta = \tan^{-1}\frac{495}{260} \approx 62°$$

[2.] The height of the pyramid, h, from the archaeologist's eye-level to the top, may be found using the tangent function, $\tan\theta = \dfrac{h}{\text{adjacent}}$. The angle of elevation is 50°. The adjacent side is the distance from the archaeologist to the base of the pyramid, or 400 ft.

$$\tan 50° = \frac{h}{400}$$

$$h = 400\tan 50° \approx 477 \text{ ft}$$

Adding 5 ft to this gives a total height of 482 ft.

	Feedback
A	Correct!
B	The tangent of an angle is the opposite side divided by the adjacent side.
C	The tangent of an angle is the opposite side divided by the adjacent side.
D	The tangent of an angle is the opposite side divided by the adjacent side.

4. C

$\sin\theta = \dfrac{\text{opp.}}{\text{hyp.}} = \dfrac{108}{180} = \dfrac{3}{5}$; $\cos\theta = \dfrac{\text{adj.}}{\text{hyp.}} = \dfrac{144}{180} = \dfrac{4}{5}$; $\tan\theta = \dfrac{\text{opp.}}{\text{adj.}} = \dfrac{108}{144} = \dfrac{3}{4}$

	Feedback
A	The sine is the ratio of the length of the opposite leg to the length of the hypotenuse.
B	The tangent is the ratio of the length of the opposite leg to the length of the adjacent leg.
C	Correct!
D	The cosine is the ratio of the length of the adjacent leg to the length of the hypotenuse.

5. C

$\sin\ \theta = \dfrac{\text{opp.}}{\text{hyp.}}$	You know the length of the hypotenuse and want to find the length of the side opposite the given angle. Use the sine function.
$\sin 45° = \dfrac{x}{20}$	Substitute 45° for θ, x for opp., and 20 for hyp.
$\dfrac{\sqrt{2}}{2} = \dfrac{x}{20}$	Substitute $\dfrac{\sqrt{2}}{2}$ for sin 45°.
$x = 10\sqrt{2}$	Multiply both sides by 20 to solve for x.

	Feedback
A	Use the sine function.
B	Use the sine function.
C	Correct!
D	The sine of angle is the ratio of the length of the opposite leg to the length of the hypotenuse.

6. C

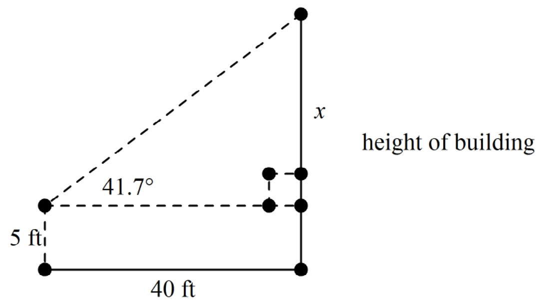
$\tan\ \theta = \dfrac{\text{opp.}}{\text{adj.}}$	
$\tan 10° = \dfrac{10{,}000}{x}$	Substitute 10° for θ, 10,000 for opp., and x for adj.
$x(\tan 10°) = 10{,}000$	Multiply both sides by x.
$x = \dfrac{10{,}000}{\tan 10°} \approx 56{,}713$	Divide both sides by tan 10°. Use a calculator to simplify.

The land distance from the airplane to the airport is about 56,713 feet.

	Feedback
A	The tangent function is the ratio of the length of the opposite leg to the length of the adjacent leg, not the length of the adjacent leg to the length of the opposite leg.
B	Use the tangent function, not the sine function.
C	Correct!
D	Set your graphing calculator to interpret angle values as degrees, not radians.

7. A

Step 1 Draw and label a diagram to represent the information given in the problem.



Step 2 Let x represent the height of the building from the surveyor's eye level. Determine the value of x.

$\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}}$	Use the tangent function.
$\tan 41.7 = \dfrac{x}{40}$	Substitute using x for opposite, 41.7 for θ, and 40 for adjacent.
$40(\tan 41.7) = x$	Multiply both sides by 40.
$x \approx 35.6387$	Use a calculator to solve for x.

Step 3 Determine the overall height of the building.

height $\approx x + 5 = 36 + 5$	The surveyor's eye level is 5 ft above the ground, so add 5 ft to the overall height of the building.
height ≈ 41	The height of the building is about 41 ft.

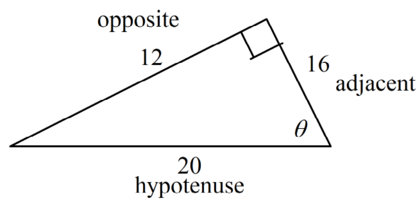
	Feedback
A	Correct!
B	The angle of elevation is the angle between the horizon and the top of the building.
C	Draw a diagram to organize the information. Use the tangent function.
D	Add the height from the ground to eye level to get the total height of the building.

8. D

Step 1 Find the length of the hypotenuse.

$a^2 + b^2 = c^2$	Pythagorean Theorem
$c^2 = (12)^2 + (16)^2$	Substitute 12 for *a* and 16 for *b*.
$c^2 = 400$	Simplify.
$c = 20$	Solve for *c*. Eliminate the negative solution.

Step 2 Find the function values. Simplify.



$\sin\theta = \frac{\text{opp.}}{\text{hyp.}} = \frac{12}{20} = \frac{3}{5}$	$\cos\theta = \frac{\text{adj.}}{\text{hyp.}} = \frac{16}{20} = \frac{4}{5}$	$\tan\theta = \frac{\text{opp.}}{\text{adj.}} = \frac{12}{16} = \frac{3}{4}$
$\csc\theta = \frac{1}{\sin\theta} = \frac{20}{12} = \frac{5}{3}$	$\sec\theta = \frac{1}{\cos\theta} = \frac{20}{16} = \frac{5}{4}$	$\cot\theta = \frac{\text{adj.}}{\text{opp.}} = \frac{16}{12} = \frac{4}{3}$

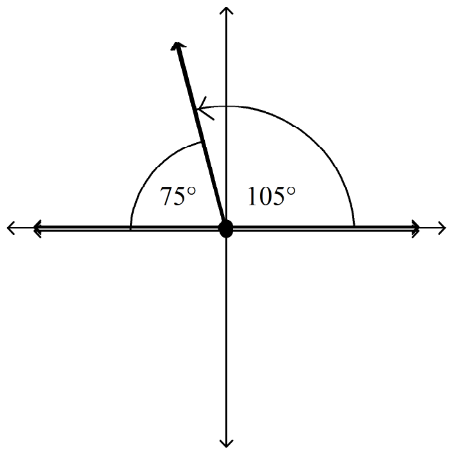
	Feedback
A	Identify the opposite and adjacent sides of the right triangle with respect to the angle theta.
B	Use the Pythagorean Theorem to find the length of the hypotenuse. Identify the opposite and adjacent sides of the right triangle with respect to the angle theta.
C	Use the Pythagorean Theorem to find the length of the hypotenuse.
D	Correct!

9. A

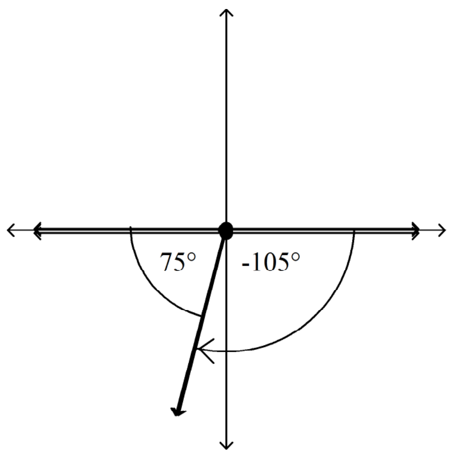
Start with the initial side on the positive *x*-axis and rotate the terminal side 65° counterclockwise.

	Feedback
A	Correct!
B	Start with the initial side on the positive *x*-axis and then rotate the angle counterclockwise, not clockwise.
C	Start with the initial side on the positive *x*-axis not the positive *y*-axis.
D	Start with the initial side on the positive *x*-axis not the negative *x*-axis.

10. B
The reference angle is the acute angle created by the terminal side of θ and the x-axis.
For example:
When $\theta = 105°$, the reference angle measures 75°.



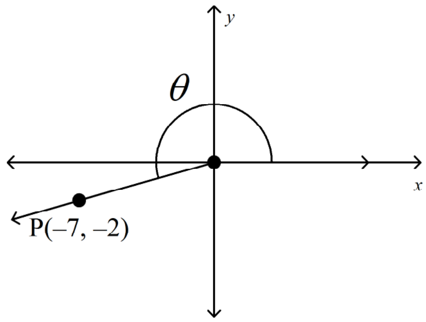
When $\theta = -105°$, the reference angle also measures 75°.



	Feedback
A	The reference angle is always positive.
B	Correct!
C	The reference angle is an acute angle
D	The reference angle is the acute angle between the terminal side of the angle and the x-axis, not the y-axis.

11. A

Step 1 Plot point *P,* and use it to sketch angle θ in standard position.
Find *r*.



$r = \sqrt{(-7)^2 + (-2)^2} = \sqrt{53}$

Step 2 Find $\sin\theta$, $\cos\theta$, and $\tan\theta$.

$\sin\theta = \dfrac{y}{r} = \dfrac{-2}{\sqrt{53}} = -\dfrac{2\sqrt{53}}{53}$; $\cos\theta = \dfrac{x}{r} = \dfrac{-7}{\sqrt{53}} = -\dfrac{7\sqrt{53}}{53}$; $\tan\theta = \dfrac{y}{x} = \dfrac{-2}{-7} = \dfrac{2}{7}$

Step 3 Use reciprocals to find csc θ, sec θ, and cot θ.

$\csc\theta = \dfrac{1}{\sin\theta} = -\dfrac{\sqrt{53}}{2}$; $\sec\theta = \dfrac{1}{\cos\theta} = -\dfrac{\sqrt{53}}{7}$; $\cot\theta = \dfrac{1}{\tan\theta} = \dfrac{7}{2}$

	Feedback
A	Correct!
B	Plot the point *P* and sketch the angle in standard position.
C	Plot the point *P* and sketch the angle in standard position.
D	Plot the point *P* and sketch the angle in standard position.

12. D

An angle is coterminal if it forms the same angle with the positive *x*-axis as the original angle. This occurs when the angle is $(360°)n$ more than the original angle, where n is an integer. Thus, $160° + (360°)n$ determines all of the coterminal angles.

	Feedback
A	An angle is coterminal if it forms the same angle with the positive *x*-axis as the original angle. Twice this angle will not form the same angle.
B	An angle is coterminal if it forms the same angle with the positive *x*-axis as the original angle. 90 degrees plus this angle will not form the same angle.
C	An angle is coterminal if it forms the same angle with the positive *x*-axis as the original angle. 180 degrees plus this angle will not form the same angle.
D	Correct!

13. A

$\left(\frac{16\pi}{9}\text{ radians}\right)\left(\frac{180°}{\pi\text{ radians}}\right) = 320°$ Multiply by $\left(\frac{180°}{\pi\text{ radians}}\right)$.

	Feedback
A	Correct!
B	Multiply by (180 degrees)/(Pi radians), and then simplify.
C	Multiply by (180 degrees)/(Pi radians), and then simplify.
D	Multiply by (180 degrees)/(Pi radians), and then simplify.

14. A

The angle passes through the point $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ on the unit circle.

$\cos\theta = x$

$\cos 210° = -\frac{\sqrt{3}}{2}$

	Feedback
A	Correct!
B	The cosine of an angle is equal to the x-value of the point where the angle intersects the unit circle, not the y-value.
C	The cosine of an angle is equal to the x-value of the point where the angle intersects the unit circle.
D	The cosine of an angle is equal to the x-value of the point where the angle intersects the unit circle.

15. B

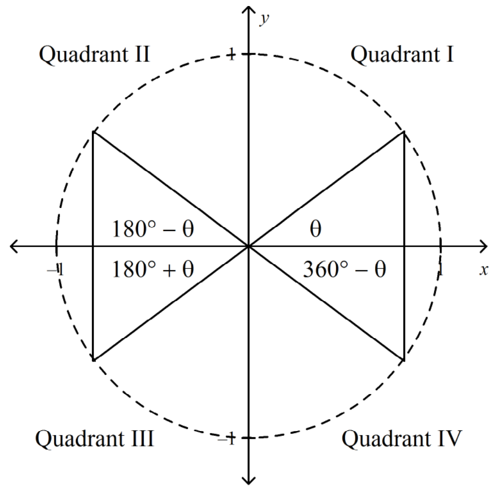
Step 1 Find the measure of the reference angle.
The angle is in Quadrant I.
The measure of the reference angle is 30º.

Step 2 Find the cosine of the reference angle.

$\cos 30^\circ = \dfrac{\sqrt{3}}{2}$

Step 3 Adjust the signs if needed.
In quadrant I, the cosine is positive.

$\cos 30^\circ = \dfrac{\sqrt{3}}{2}$



	Feedback
A	Check the sign of the function for the quadrant the angle is in.
B	Correct!
C	Find the reference angle and evaluate the function at the reference angle. Adjust the signs if necessary.
D	Find the reference angle and evaluate the function at the reference angle. Adjust the signs if necessary.

16. C

Step 1 Find the radius of the tire.

$r = \dfrac{d}{2} = 13$ inches.

Step 2 Find the angle θ (in radians) through which the point on the tire rotates in 1 hour.

$$\frac{3 \text{ rotations}}{1 \text{ second}} \cdot \frac{2\pi \text{ radians}}{1 \text{ rotation}} = \frac{6\pi \text{ radians}}{1 \text{ second}}$$

Use proportions to convert seconds to hours.

$$\frac{6\pi \text{ radians}}{1 \text{ second}} \cdot \frac{60 \text{ seconds}}{1 \text{ minute}} \cdot \frac{60 \text{ minutes}}{1 \text{ hour}} = \frac{21600\pi \text{ radians}}{1 \text{ hour}}$$

Step 3 Find the length of the arc intercepted by $21,600\pi$ radians.

$s = r\theta = 13(21,600\pi) = 280,800\pi$ inches

Use proportions to convert inches to miles.

$$\frac{280{,}800\pi \text{ inches}}{1} \cdot \frac{1 \text{ foot}}{12 \text{ inches}} \cdot \frac{1 \text{ mile}}{5{,}280 \text{ feet}} = 4.432\pi \text{ miles} \approx 14 \text{ miles}$$

	Feedback
A	Find the radius of the tire and the angle through which the tire rotates. Then find the arc length in miles. Remember to multiply by pi.
B	Find the radius of the tire and the angle through which the tire rotates. Then find the arc length in miles. Remember to multiply by pi.
C	Correct!
D	Find the radius of the tire and the angle through which the tire rotates. Then find the arc length in miles.

17. A

Step 1 Find the values between 0 and 2π radians for which $\sin\theta$ is equal to $\frac{\sqrt{3}}{2}$.

$\frac{\sqrt{3}}{2} = \sin\frac{\pi}{3}$, $\frac{\sqrt{3}}{2} = \sin\frac{2\pi}{3}$ Use y-coordinates of points on the unit circle.

Step 2 Find the angles that are coterminal with angles measuring $\frac{\pi}{3}$ and $\frac{2\pi}{3}$ radians.

$\frac{\pi}{3} + (2\pi)n$, $\frac{2\pi}{3} + (2\pi)n$ Add integer multiples of 2π radians, where n is an integer.

	Feedback
A	Correct!
B	Find the possible values of the inverse of the sine function, not the reciprocal of the sine function.
C	Find the angles on the unit circle where the y-value is the square root of 3 over 2, then add integer multiples of 2 pi.
D	Find the angles on the unit circle where the y-value is the square root of 3 over 2, then add integer multiples of 2 pi.

18. B

$-1 = \text{Sin}\,\theta$ Find the value of θ for $-\pi \le \theta \le \pi$ whose sine is -1.

$-1 = \text{Sin}\left(-\frac{\pi}{2}\right)$ Use y-coordinates of points on the unit circle.

$\text{Sin}^{-1}(-1) = -\frac{\pi}{2}$ or $-90°$.

	Feedback
A	The range in radians of the inverse sine function is -Pi/2 to Pi/2.
B	Correct!
C	If (x, y) is the point on the unit circle corresponding to the angle theta, the sine of theta is y.
D	If (x, y) is the point on the unit circle corresponding to the angle theta, the sine of theta is y.

19. A

Find the value of θ.

$\tan\theta = \dfrac{\text{opp.}}{\text{adj.}}$	Use the tangent ratio.
$\tan\theta = \dfrac{35}{46}$	Substitute 35 for opp. and 46 for adj. Then simplify.
$\theta = \tan^{-1}\left(\dfrac{35}{46}\right) = 37°$	Use the inverse tangent function on your calculator to find the value of θ.

The angle of elevation of the sun from the end of the shadow is 37°.

	Feedback
A	Correct!
B	Use the inverse tangent function on your calculator to find the value of theta.
C	Use the inverse tangent function on your calculator to find the value of theta.
D	Use the tangent ratio, and substitute 35 for opp. and 46 for adj.

20. C

$\text{area} = \frac{1}{2}bh$	Write the area formula.
$h = a\sin C$	Solve for h using trigonometric ratios.

$\text{area} = \frac{1}{2}ab\sin C$

$\text{area} = \frac{1}{2}(7)(7)\sin 73 = 23.4\ \text{ft}^2$	Substitute.

	Feedback
A	The area of a triangle is one half the product of the lengths of two of the sides and the sine of their included angle.
B	The first term of the area formula for a triangle is one half.
C	Correct!
D	The area of a triangle is one half the product of the lengths of two of the sides and the sine of their included angle.

21. D

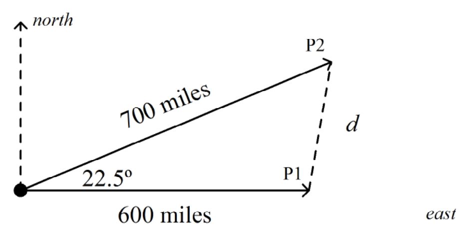
Step 1 Find the third angle measure.
$m\angle M + m\angle N + m\angle P = 180°$
$m\angle M + 121° + 33° = 180°$
$m\angle M = 26°$

Step 2 Find the unknown side lengths.

$\frac{\sin M}{m} = \frac{\sin N}{n}$	Law of Sines	$\frac{\sin M}{m} = \frac{\sin P}{p}$
$\frac{\sin 26°}{12} = \frac{\sin 121°}{n}$	Substitute.	$\frac{\sin 26°}{12} = \frac{\sin 33°}{p}$
$n = \frac{12 \sin 121°}{\sin 26°}$ $n \approx 23.5$	Solve for the unknown side.	$p = \frac{12 \sin 33°}{\sin 26°}$ $p \approx 14.9$

	Feedback
A	Use the Law of Sines correctly to find the measure of *p*.
B	Use the Law of Sines correctly.
C	Use the Law of Sines correctly to find the measure of *n*.
D	Correct!

22. A



Each plane is flying for 2 hours, so they travel 600 and 700 miles respectively.

Use the law of cosines to find the distance, *d*.
$d^2 = (p1)^2 + (p2)^2 - 2(p1)(p2)\cos(D)$
$d^2 = (600)^2 + (700)^2 - 2(600)(700)\cos(22.5°) \approx 73{,}941.19$
$d \approx 272$ miles

	Feedback
A	Correct!
B	The planes are traveling for 2 hours.
C	Use the Law of Cosines to find the distance.
D	Use the Law of Cosines to find the distance.

23. A

Use Heron's formula: $A = \sqrt{s(s-a)(s-b)(s-c)}$.

Find s.

$s = \frac{1}{2}(a+b+c) = \frac{1}{2}(150+200+280) = 315$

Find the area of the triangle.

$A = \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{315(315-150)(315-200)(315-280)}$

$A \approx 14{,}464 \text{ ft}^2$

	Feedback
A	Correct!
B	When finding s, divide by 2.
C	This is the value of s, now find the area.
D	Find s, then use Heron's Formula.