

Student: _____
Date: _____
Time: _____

Instructor: Andy Davis
Course: MATH 130 -
TRIGONOMETRY (4 UNITS) Fall
2008
Book: Sullivan: Trigonometry: A Unit
Circle Approach, 8e

Assignment: Homework 2: Angles,
Arclength and Velocity

1.

Draw the angle.

120°

Choose the correct answer below.

A.



B.



C.



D.



2.

Draw the angle.

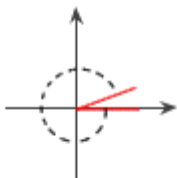
300°

Choose the correct answer below.

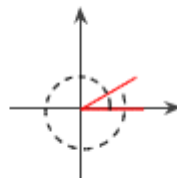
A.



B.



C.



D.



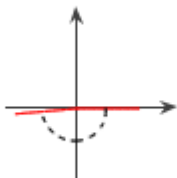
3.

Choose the figure that shows an angle of 135° in standard position.

A.



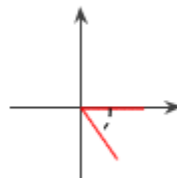
B.



C.



D.



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4.

Choose the figure that shows an angle of $\frac{3\pi}{2}$ radians in standard position.

Choose the correct answer below.

A. B. C. D.

The figure shows four coordinate planes, each with a red terminal side and a dashed arc indicating the angle.
A: The terminal side is on the positive y-axis, representing an angle of $\frac{\pi}{2}$.
B: The terminal side is on the negative y-axis, representing an angle of $\frac{3\pi}{2}$.
C: The terminal side is in the fourth quadrant, representing an angle of $\frac{3\pi}{4}$.
D: The terminal side is on the positive x-axis, representing an angle of $\frac{\pi}{4}$.

5.

Choose the figure that shows an angle of $-\frac{5\pi}{6}$ radians in standard position.

Choose the correct answer below.

A. B. C. D.

The figure shows four coordinate planes, each with a red terminal side and a dashed arc indicating the angle.
A: The terminal side is in the fourth quadrant, representing an angle of $-\frac{\pi}{6}$.
B: The terminal side is in the third quadrant, representing an angle of $-\frac{5\pi}{6}$.
C: The terminal side is in the first quadrant, representing an angle of $\frac{\pi}{6}$.
D: The terminal side is in the first quadrant, representing an angle of $\frac{\pi}{3}$.

6.

Choose the figure that shows an angle of $\frac{7\pi}{2}$ radians in standard position.

Choose the correct answer below.

A. B. C. D.

The figure shows four coordinate planes, each with a red terminal side and a dashed arc indicating the angle.
A: The terminal side is on the positive y-axis, representing an angle of $\frac{\pi}{2}$.
B: The terminal side is on the negative y-axis, representing an angle of $\frac{3\pi}{2}$.
C: The terminal side is on the positive y-axis, representing an angle of $\frac{\pi}{2}$.
D: The terminal side is on the positive y-axis, representing an angle of $\frac{\pi}{2}$.

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7.

Convert the angle to a decimal in degrees.

$$41^{\circ}12'9''$$

$$41^{\circ}12'9'' = \square^{\circ}$$

(Do not round until the final answer. Then round to two decimal places as needed.)

8.

Convert the angle to a decimal in degrees.

$$7^{\circ}6'2''$$

$$7^{\circ}6'2'' = \square^{\circ}$$

(Do not round until the final answer. Then round to two decimal places as needed.)

9.

Convert the angle to a decimal in degrees.

$$7^{\circ}7'7''$$

$$7^{\circ}7'7'' = \square^{\circ}$$

(Do not round until the final answer. Then round to two decimal places as needed.)

10.

Convert the angle to D^oM'S" form.

$$59.27^{\circ}$$

$$59.27^{\circ} = \square^{\circ}\square'\square''$$

11.

Convert the angle to D^oM'S" form.

$$42.229^{\circ}$$

$$42.229^{\circ} = \square^{\circ}\square'\square'' \text{ (Round to the nearest second.)}$$

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12.

Convert the angle to D°M'S" form.

$$12.22^\circ$$

$$12.22^\circ = \square^\circ \square' \square''$$

13.

Convert the angle in degrees to radians.

$$75^\circ$$

$$75^\circ = \square \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

14.

Convert the angle in degrees to radians.

$$255^\circ$$

$$255^\circ = \square \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

15.

Convert the angle in degrees to radians.

$$-135^\circ$$

$$-135^\circ = \square \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

16.

Convert the angle in degrees to radians.

$$-180^\circ$$

$$-180^\circ = \square \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

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17.

Convert the angle in degrees to radians.

$$-15^\circ$$

$$-15^\circ = \boxed{} \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

18.

Convert the angle in degrees to radians.

$$-90^\circ$$

$$-90^\circ = \boxed{} \text{ radian(s)}$$

(Simplify your answer. Type an exact answer in terms of π .)

19.

Convert the angle in radians to degrees.

$$\frac{2\pi}{3}$$

$$\frac{2\pi}{3} = \boxed{}^\circ$$

(Simplify your answer.)

20.

Convert the angle in radians to degrees.

$$\frac{7\pi}{4}$$

$$\frac{7\pi}{4} \text{ radians} = \boxed{}^\circ \text{ (Type a whole number.)}$$

21.

Convert the angle in radians to degrees.

$$\frac{7\pi}{4}$$

$$\frac{7\pi}{4} = \boxed{}^\circ \text{ (Simplify your answer.)}$$

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22.

Convert the angle in radians to degrees.

$$\frac{\pi}{10}$$

$$\frac{\pi}{10} = \boxed{}^\circ \text{ (Simplify your answer.)}$$

23.

Convert the angle in radians to degrees.

$$-\frac{\pi}{2}$$

$$-\frac{\pi}{2} = \boxed{}^\circ \text{ (Simplify your answer.)}$$

24.

Convert the angle in radians to degrees.

$$-\frac{3\pi}{4}$$

$$-\frac{3\pi}{4} = \boxed{}^\circ \text{ (Simplify your answer.)}$$

25.

Convert the angle in degrees to radians.

$$5^\circ$$

$$5^\circ = \boxed{} \text{ radian(s)}$$

(Round to two decimal places as needed.)

26.

Convert the angle in degrees to radians.

$$-20^\circ$$

$$-20^\circ = \boxed{} \text{ radian(s)}$$

(Round to two decimal places as needed.)

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27.

Convert the angle in degrees to radians.

141°

141° = radian(s)

(Simplify your answer. Round to two decimal places as needed.)

28.

Convert the angle in radians to degrees.

3.23

3.23 radians = ° (Round to two decimal places as needed.)

29.

Convert the angle in radians to degrees.

10

10 radians = °

(Simplify your answer. Round to two decimal places as needed.)

30.

Convert the angle in radians to degrees. Express your answer in decimal form.

4.07

4.07 radians = ° (Round to two decimal places.)

31.

Find the length s of the arc of a circle of radius 6 centimeters subtended by the central angle $\frac{1}{3}$ radian.

s (arc length) = centimeters

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32.

s denotes the length of the arc of a circle of radius r subtended by the central angle θ .
Find the missing quantity.

$$\theta = \frac{1}{2} \text{ radian, } s = 3 \text{ feet, } r = ?$$

The radius r of the circle is feet. (Simplify your answer.)

33.

Find the central angle θ which subtends an arc of length **15 miles** of a circle of radius
21 miles.

$$\theta \approx \text{ radians} \text{ (Round to six decimal places as needed.)}$$

Convert to degrees.

$$\theta \approx \text{ degrees} \text{ (Round to three decimal places as needed.)}$$

34.

Find the length s of the arc of a circle of radius **20 feet** subtended by the central angle
78°.

$$s \text{ (arc length)} = \text{ feet} \text{ (Round to three decimal places.)}$$

35.

Find the area A of the sector of a circle of radius **20 miles** formed by the central angle
 $\frac{1}{10}$ radian.

$$A \text{ (area)} = \text{ miles}^2 \text{ (Round to three decimal places.)}$$

36.

Find the radius of a circle which has a sector of area **21 square feet** determined by a
central angle $\frac{1}{3}$ radian.

$$r \approx \text{ feet} \text{ (Round to three decimal places.)}$$

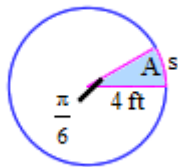
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37.

Find the length s and area A .



$s = \square$ feet

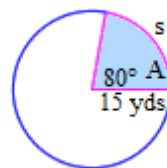
(Round to three decimal places as needed.)

$A = \square$ square feet

(Round to three decimal places as needed.)

38.

Find the length s and area A .



The length of the arc is \square yards.

(Round to three decimal places as needed.)

The area A of the sector is \square square yards.

(Round to three decimal places as needed.)

39.

The minute hand of a clock is **5 inches** long. How far does the tip of the minute hand move in **20 minutes**?

\square inches (Round to three decimal places.)

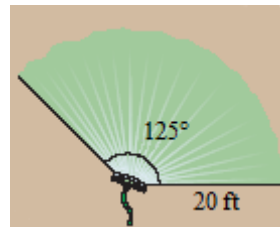
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40.

A water sprinkler sprays water over a distance of 20 feet while rotating through an angle of 125° . What area of lawn receives water?



The area A of the sector is square feet.
(Round to two decimal places as needed.)

41.

An object is traveling around a circle with a radius of 10 inches. If in 50 seconds a central angle of $\frac{1}{4}$ radian is swept out, what are the linear and angular speeds of the object?

The linear speed of the object is

$v \approx$ inches / sec (Round to three decimal places.)

The angular speed of the object is

$\omega \approx$ radian / sec (Round to three decimal places.)

42.

The diameter of each wheel of a bicycle is 28 inches. If you are traveling at a speed of 15 miles per hour on this bicycle, through how many revolutions per minute are the wheels turning?

$\frac{\text{revolutions}}{\text{minute}}$ (Round to one decimal place.)

43.

City A is due north of City B. Find the distance between City A ($37^\circ 2'$ north latitude) and City B ($19^\circ 38'$ north latitude). Assume that the radius of Earth is 3960 miles.

The distance between City A and City B is miles.
(Round to the nearest mile as needed.)

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44.

A planet rotates on an axis through its poles and 1 revolution takes 1 day (1 day is 26 hours). The distance from the axis to a location on the planet 30° north latitude is about 2253.5 miles. Therefore, a location on the planet at 30° north latitude is spinning on a circle of radius 2253.5 miles. Compute the linear speed on the surface of the planet at 30° north latitude.

The linear speed on the surface of the planet is miles/hr.

(Round the final answer to the nearest integer as needed. Round all intermediate values to five decimal places as needed.)

45.

To approximate the speed of the current of a river, a circular paddle wheel with radius 6 ft. is lowered into the water. If the current causes the wheel to rotate at a speed of 20 revolutions per minute, what is the speed of the current?



The speed of the current is $\frac{\text{miles}}{\text{hour}}$.

(Round to two decimal places.)

46.

At a museum you can see the four cable lines that are used to pull cable cars up and down a hill. Each cable travels at a speed of 9.45 miles per hour, caused by a rotating wheel whose diameter is 7.5 feet. How fast is the wheel rotating? Express your answer in revolutions per minute.

The angular speed of the wheel is rev/min.

(Round to two decimal places as needed.)