PRECALCULUS Name Cornely ID: 1

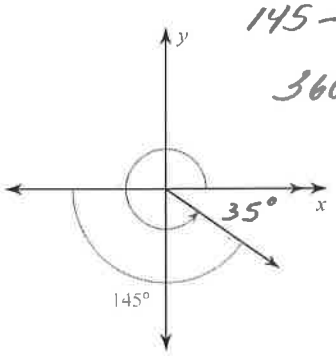
4.2 Review

Date _____ Period ____

Find the measure of each angle.

1) 145 − 180 = 35°

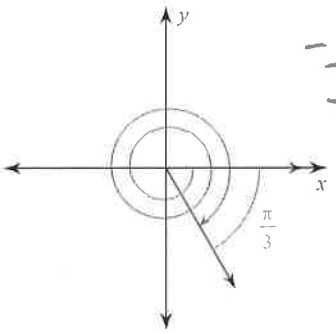
360 − 35 = 325°



180° + 145° = 325°

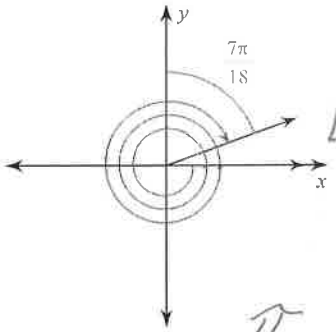
2) $-2\pi - 2\pi - \frac{\pi}{3}$

$-\frac{6\pi}{3} - \frac{6\pi}{3} - \frac{\pi}{3}$



$-\frac{13\pi}{3}$

3)

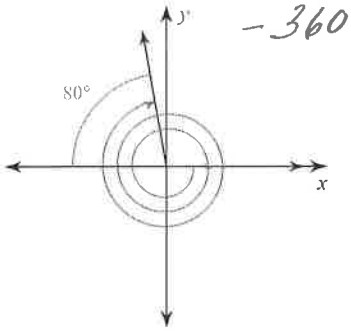


$-\frac{53\pi}{9}$

$-2\pi - 2\pi - \pi - \frac{\pi}{2} - \frac{7\pi}{18}$

$\frac{-36\pi}{18} - \frac{36\pi}{18} - \frac{18\pi}{18} - \frac{9\pi}{18} - \frac{7\pi}{18} = \frac{-106\pi}{18}$

4)



$-360 - 360 - 180 - 80$

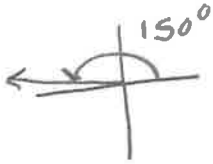
$-980°$

State the quadrant in which the terminal side of each angle lies.

5) −285°

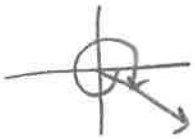
QI

6) $\frac{5\pi}{6}$



QII

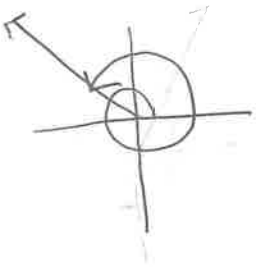
7) $-\frac{9\pi}{4}$ $-405°$



QIV

$-2\pi - \frac{\pi}{4}$

8) $\frac{49\pi}{18}$

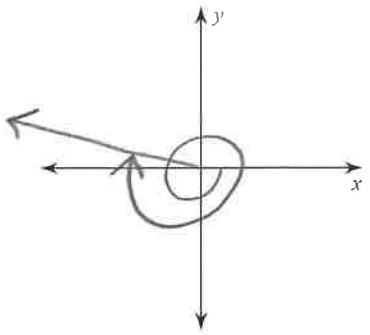


QII

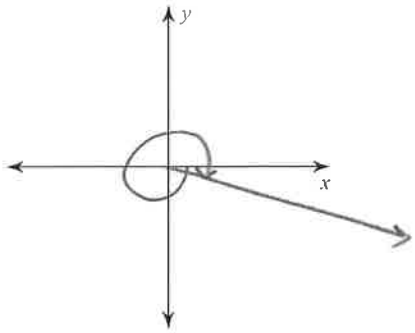
$\frac{9}{4} = 2\frac{1}{4}$

Draw an angle with the given measure in standard position.

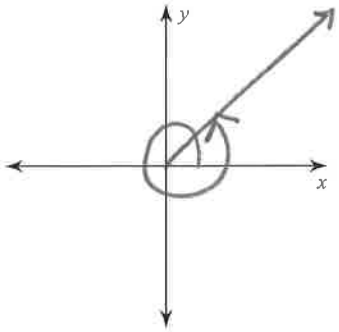
9) $-560° + 360 = -200$



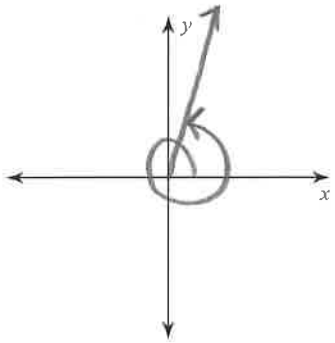
10) $-\frac{19\pi}{9}$ $-380°$



11) $\frac{9\pi}{4}$ $405°$



12) $440° - 360 = 80$



Find a positive and a negative coterminal angle for each given angle.

13) $-230°$

$-230 + 360 = \boxed{130°}$

$-230 - 360 = \boxed{-590°}$

14) $630°$

$630 - 360° = \boxed{270°}$

$270 - 360° = \boxed{-90°}$

15) $-\frac{61\pi}{45}$

$-\frac{61\pi}{45} + \frac{90\pi}{45} = \frac{29\pi}{45}$

$-\frac{61\pi}{45} - \frac{90\pi}{45} = \boxed{\frac{-151\pi}{45}}$

16) π

$\pi + 2\pi = \boxed{3\pi}$

$\pi - 2\pi = \boxed{-\pi}$

State if the given angles are coterminal.

17) $\frac{47\pi}{36}, -\frac{119\pi}{36}$

$\frac{47\pi}{36} - \frac{72\pi}{36}$ ...

No!

18) $\frac{\pi}{3}, -\frac{8\pi}{3}$

$\frac{\pi}{3} - \frac{6\pi}{3}$ ... Nope!

19) 325°, −35°

Yes!

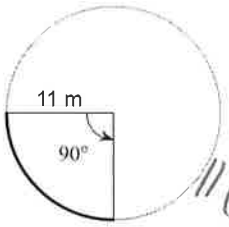
20) 30°, −330°

Yes!

Find the length of each arc. Round your answers to the nearest tenth.

$s = r\theta$

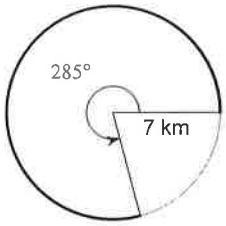
21)



$\frac{90}{1} \cdot \frac{\pi}{180} = \frac{\pi}{2}$

$11\left(\frac{\pi}{2}\right) = \boxed{17.3\text{m}}$

22)



$\frac{285}{1} \cdot \frac{\pi}{180} = \frac{19\pi}{12}$

$7\left(\frac{19\pi}{12}\right) = \boxed{34.8\text{km}}$

23) $r = 12$ yd, $\theta = 150°$

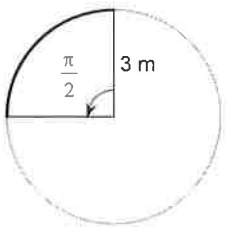
$\frac{150}{1} \cdot \frac{\pi}{180} = \frac{5\pi}{6}$

$12\left(\frac{5\pi}{6}\right) = \boxed{31.4\text{yd}}$

24) $r = 18$ in, $\theta = 150°$

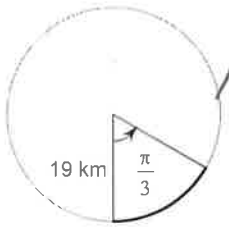
$18\left(\frac{5\pi}{6}\right) = \boxed{47.1\text{in}}$

25)



$3\left(\frac{\pi}{2}\right) = \boxed{4.7\text{m}}$

26)



$19\left(\frac{\pi}{3}\right) = \boxed{19.9\text{km}}$

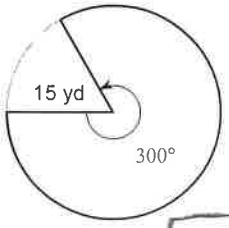
27) $r = 9$ ft, $\theta = \frac{19\pi}{12}$

$9\left(\frac{19\pi}{12}\right) = \boxed{44.8\text{ft}}$

28) $r = 16$ mi, $\theta = \frac{5\pi}{3}$

$16\left(\frac{5\pi}{3}\right) = \boxed{83.8\text{mi}}$

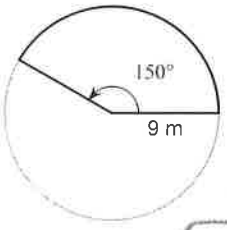
Find the area of each sector. Round your answers to the nearest tenth. $A = \frac{1}{2} r^2 \theta$

29) 

$\frac{300}{1} \cdot \frac{\pi}{180} = \frac{5\pi}{3}$

$\frac{1}{2}(15)^2\left(\frac{5\pi}{3}\right)$

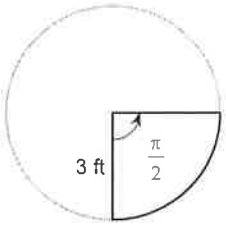
589.0 yds^2

30) 

$\frac{150}{1} \cdot \frac{\pi}{180} = \frac{5\pi}{6}$

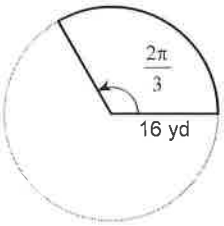
$\frac{1}{2}(9)^2\left(\frac{5\pi}{6}\right)$

106.0 m^2

31) 

$\frac{1}{2}(3)^2\left(\frac{\pi}{2}\right)$

7.1 ft^2

32) 

$\frac{1}{2}(16)^2\left(\frac{2\pi}{3}\right)$

268.1 yd^2

33) $r = 9$ m, $\theta = 300°$

$\frac{1}{2}(9)^2\left(\frac{5\pi}{3}\right)$ 212.1 m^2

34) $r = 17$ km, $\theta = 45°$

$\frac{1}{2}(17)^2\left(\frac{\pi}{4}\right) =$ 113.5 km^2

35) $r = 9$ mi, $\theta = \frac{3\pi}{4}$

$\frac{1}{2}(9)^2\left(\frac{3\pi}{4}\right)$

36) $r = 9$ ft, $\theta = \frac{3\pi}{2}$

$\frac{1}{2}(9)^2\left(\frac{3\pi}{2}\right)$ 190.9 ft^2

37) The radius of each wheel of a car is 15 inches. If the wheels are turning at a rate of 3 revolutions per second, How fast is the care moving? Express your answer in inches per second and in miles per hour.

$r = 15$ in

3 rps

$V = \frac{15 \cdot 3 \cdot 2\pi \text{ in}}{1 \text{ sec}} = 90\pi =$ 282.743 in/sec

$V = \frac{90\pi \text{ in}}{1 \text{ sec}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} =$ 16.06 mph

38) The diameter of each wheel of a bicycle is 26 inches. If you are traveling at a speed of 35 mph on this bicycile, through how many rotations per minute are the wheels turning?

diam: 26 in
V = 35mph
find rpm

$$\frac{35 \text{ miles}}{1 \text{ hr}} = \frac{13 \cdot \text{revs} \cdot 2\pi \text{ in}}{1 \text{ min}}$$

35 miles = 2217600 in
1 hr = 60 min

$$\frac{2217600 \text{ in}}{60 \text{ min}} = \frac{26\pi X \text{ in}}{1 \text{ min}}$$

$$1560\pi X = 2217600$$

$$X = \boxed{452.5 \text{ rpms}}$$

39) A riding lawn mower has wheels that are 15 inches in diameter, which are turning at 2.5 revolutions per second. What is the angular speed of the wheel? How fast is the lawn mower traveling in miles per hour?

diam: 15 in
2.5 rps

$$\omega = \frac{2.5(2\pi)}{1 \text{ sec}} = \boxed{5\pi \text{ rads/sec}}$$

$$V = \frac{7.5(5\pi) \text{ in}}{1 \text{ sec}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mile}}{5280 \text{ ft}} \cdot \frac{3600 \text{ sec}}{1 \text{ hr}} = \boxed{6.69 \text{ mph}}$$

40) Two pulleys, one with radius 2 inches and the other with radius 8 inches, are connected by a belt. If the 2 inch pulley is caused to rotate at 3 revolutions per minute, determine the revolutions per minute of the 8 inch pulley.

r: 2 in → 3rpm
r: 8 in

Linear Speed of Belt

$$\frac{2 \cdot 3 \cdot 2\pi}{1 \text{ min}} = 12\pi = 37.7 \text{ in/min}$$

revs of 8 in pulley

$$\frac{37.7 \text{ in}}{1 \text{ min}} = \frac{8 \cdot X \cdot 2\pi \text{ in}}{1 \text{ min}}$$

$$37.7 = 16\pi X$$

$$\boxed{X = .75 \text{ revs/min}}$$