



Warm up

1. What quadrant am I in?

- a.  $-200^\circ$   2
- b.  $\frac{11\pi}{9}$   3
- c. 5 radians 4

2. Am I positive or negative?

- a.  $\cos 290^\circ$   $\odot 4$  (+)
- b.  $\tan \frac{2\pi}{3}$   $\odot 2$  (-)
- c.  $\csc \frac{\pi}{4}$   $\odot 1$  +
- ratio of  $\csc \frac{\pi}{4} = \frac{1}{\sin \frac{\pi}{4}} = \frac{1}{\frac{1}{\sqrt{2}}} = \sqrt{2}$

3. Find the linear speed in miles per hour of a car whose wheel diameter is 15 inches moving 2000 rpm.

$\text{REV} \times 2\pi \rightarrow \text{radians} \times \text{radius} \rightarrow \text{LS}$

$2000 \text{ rpm} \cdot 2\pi \cdot 7.5 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$

$\text{AS} \quad \text{LS} \quad \text{17/min}$



89.25 mph

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**GO COUGARS!**

**Homework Questions**

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13. (a)  (b) 

14. (a)  $\frac{7\pi}{6}$  (b)  $\frac{2\pi}{3}$

In Exercises 15-20, find (if possible) the complement and supplement of the angle.

15.  $\frac{\pi}{6}$  16.  $\frac{2\pi}{3}$

17.  $\frac{\pi}{4}$  18.  $\frac{3\pi}{4}$

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In Exercises 9-16, sketch a right triangle corresponding to the trigonometric function of the acute angle  $\theta$ . Use the Pythagorean Theorem to determine the third side of the right triangle and then find the other five trigonometric functions of  $\theta$ .

9.  $\sin \theta = \frac{1}{2}$  10.  $\cos \theta = \frac{3}{5}$

11.  $\sec \theta = 4$  12.  $\tan \theta = \frac{1}{2}$

13.  $\tan \theta = 3$  14.  $\csc \theta = \frac{12}{5}$

15.  $\cot \theta = \frac{1}{2}$  16.  $\sin \theta = \frac{1}{3}$

In Exercises 17-42, use a calculator to evaluate each function. Round your answers to four decimal places. (Be sure the calculator is in the correct angle mode.)

17. (a)  $\sin 11^\circ$  (b)  $\cos 47^\circ$

18. (a)  $\tan 18.8^\circ$  (b)  $\cot 71.9^\circ$

19. (a)  $\sec 42^\circ 12'$  (b)  $\csc 48^\circ 7'$

20. (a)  $\cos 8^\circ 50' 25''$  (b)  $\sec 8^\circ 50' 25''$

41. (a)  $\cot \frac{\pi}{16}$  (b)  $\tan \frac{\pi}{8}$

42. (a)  $\sec 1.34$  (b)  $\cos 1.25$

Workbook Answers

1. 7.73 radians 2. 12.09 radians

3. 1441.94 revolutions 4a. 14.29 miles 4b. 211.6 centimeters

5a. 5.28 cm/sec 6. 104.72 rad/sec

5b. 8.73 cm/sec 7. 17.48 ft/sec 8. fastest - outside 9. 17222.54 mph 10. 728.29 revolutions

**4.1. Linear & Angular Speeds WS #3**

1. A wheel rotates 1.23 revolutions per minute. Find the angular speed in radians of a point on the wheel.

2. Determine the angular speed in radians per second of a wheel turning 124 revolutions per minute.

3. Determine the number of revolutions per minute of the wheel rotating 15 rad/s.

4. Determine linear speed of a point rotating at the given angular speed at a distance (radius) from the axis of rotation

A)  $r=1.3m$   $\omega=3.5\pi \text{ rad/s}$  B)  $r=9.2cm$   $\omega=23 \text{ rad/s}$

5. Determine the linear speed of a point on a circle  $r$  units from the center that moves through an angle  $\theta$  in 1 min. Express answer in cm/s.

A)  $r=72cm$   $\theta=1.48 \text{ rad}$  B)  $r=1.2 \text{ m}$   $\theta=25^\circ$

6. If an engine is making 3000rpm, what is the angular speed of the engine's crank shaft in radians/sec.

7. A Ferris wheel 250 ft in diameter makes one revolution every 45 seconds. Determine the linear speed of a car on the rim of the wheel.

8. A large merry-go-around is four horses deep. What seat should a child choose for the fastest ride? For the slowest?

9. Astronomy: A space telescope orbits about the earth in a circular orbit at a distance of 380 mi from the earth's surface. It makes one orbit every 95 min. Find its linear speed in mph. (the radius of the earth is approximately 3960 mi).

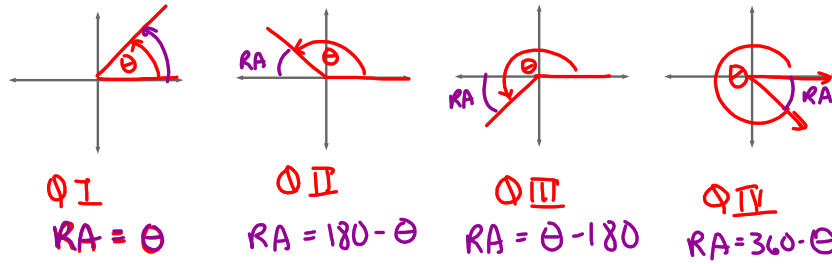
10. A car is moving at a speed of 65 mph. the diameter of the wheels is 2.5 ft. Find the angular speed of the wheel in radians per minute and find the number of revolutions per minute the wheels are rotating.

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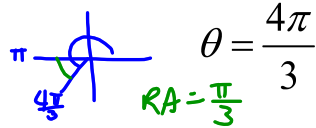
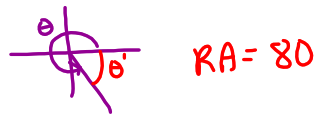


Reference Angle - the angle formed by the terminal side of an angle and the closest x-axis

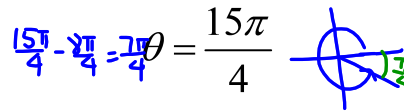
A reference angle is **always positive**.



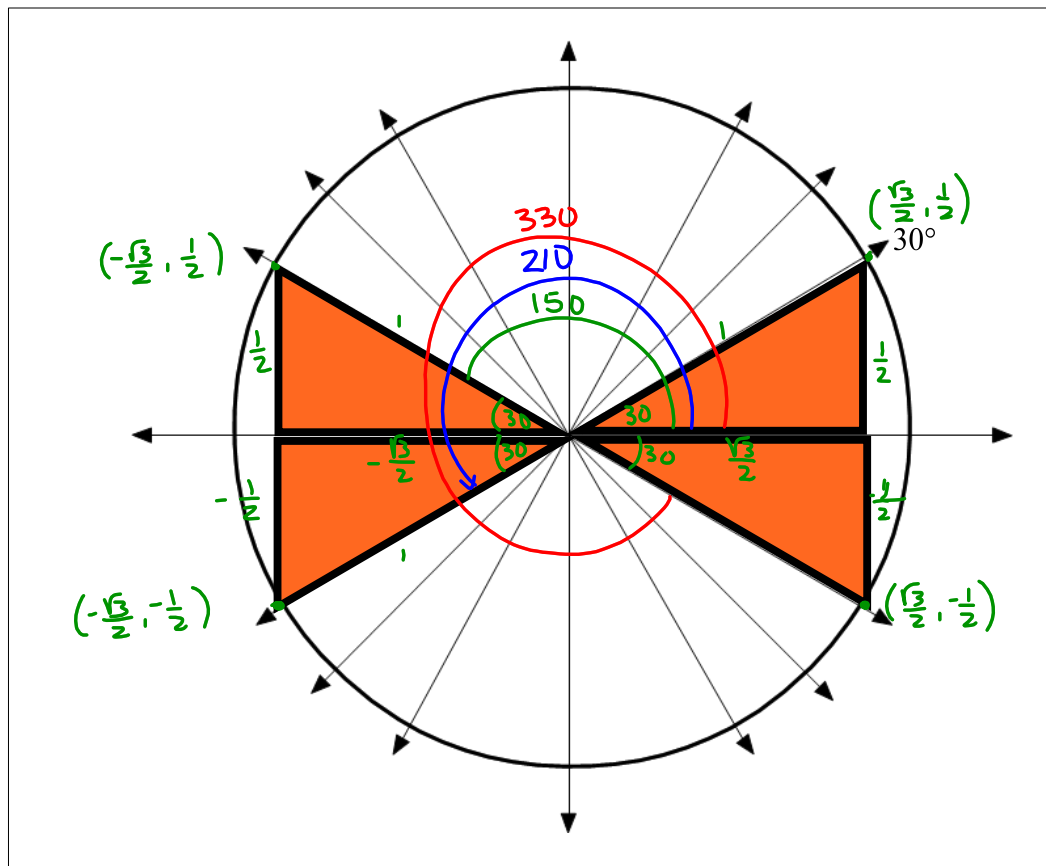
Find RA if:  $\theta = 280^\circ$



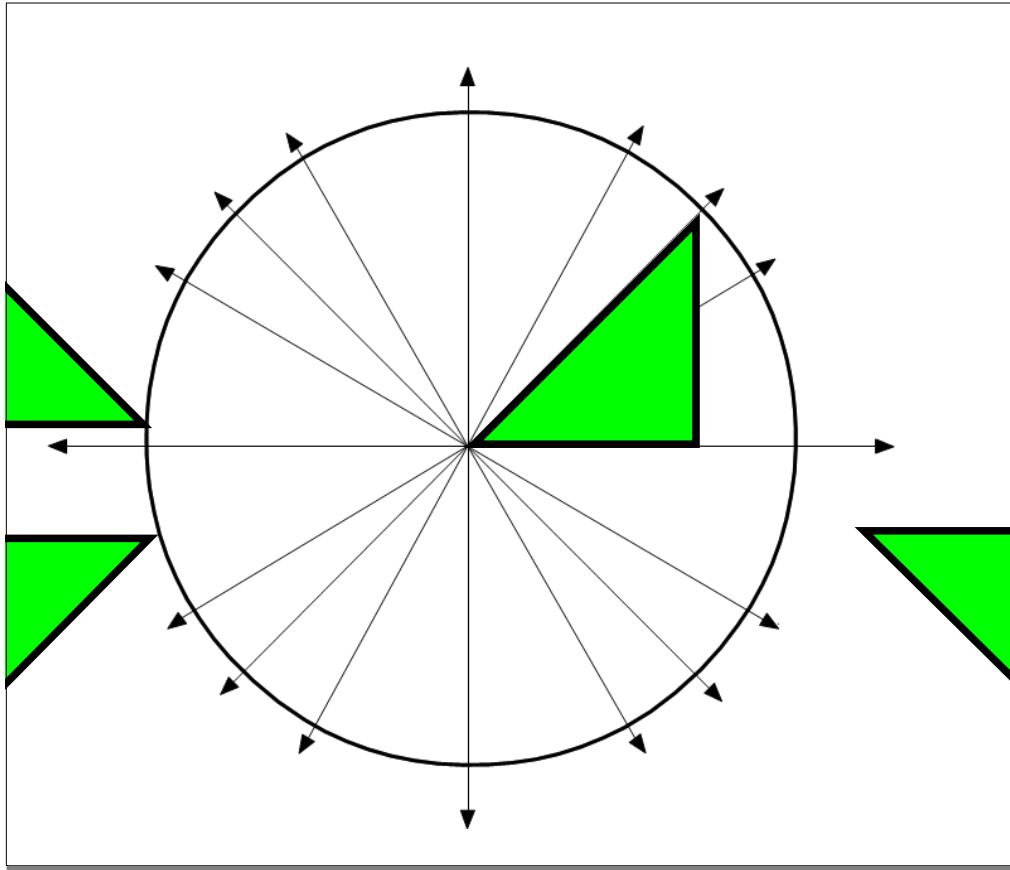
$\theta = -225^\circ$



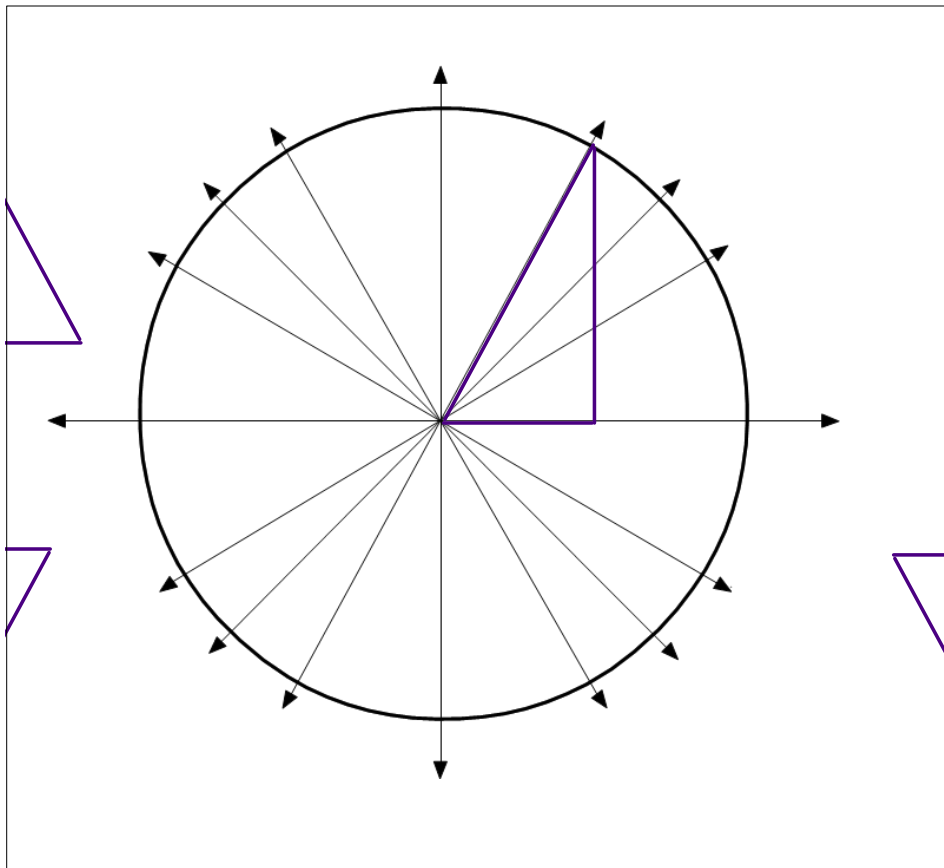
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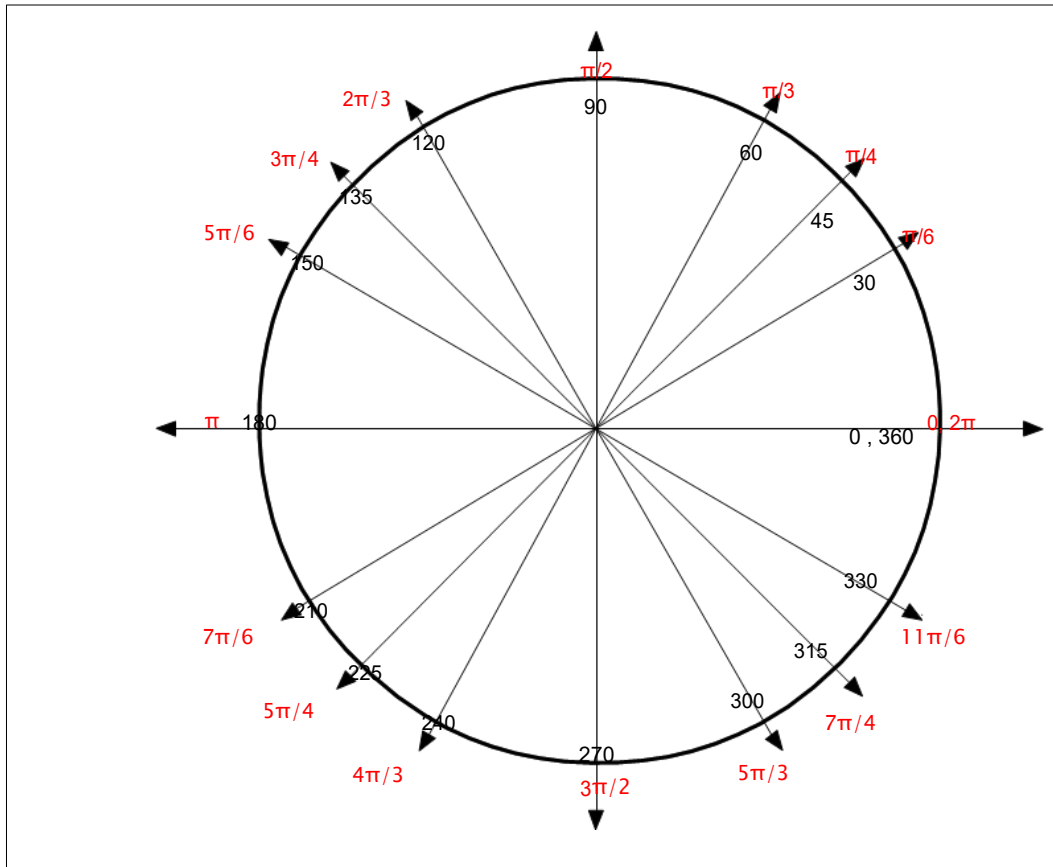
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Jan 11-12:15 PM



Jan 11-12:19 PM



Jan 3-2:37 PM

Let's Practice using what we know about reference angles and the signs in the quadrants.

Find the following ratios/values:

$\cos \frac{2\pi}{3}$     Q 2    RA  $\frac{\pi}{3}$     ratio  $\cos \frac{\pi}{3}$     + or -     $-\frac{1}{2}$

$\sec 330^\circ$     Q 4    RA 30     $\sec 30 = \frac{2}{\sqrt{3}}$     + or -     $+\frac{2}{\sqrt{3}}$

$\tan \frac{\pi}{2}$      $\frac{\sin}{\cos} = \frac{1}{0} = \text{und!}$     (0,1)

$\sin \left( -\frac{7\pi}{6} \right)$      $-\frac{7\pi}{6} + \frac{12\pi}{6} = \frac{5\pi}{6}$     Q 2    RA  $\frac{\pi}{6}$      $\sin \frac{\pi}{6} = \frac{1}{2}$     + or -     $\frac{1}{2}$

$\cot \frac{3\pi}{4} = -1$     Q 2    RA  $\frac{\pi}{4}$      $\tan \frac{\pi}{4} = 1$     flip    + -    -1

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# HOMework



p 294 22-24 all, ~~39-93~~ by 3's

39-63 by 3's

78-87 by 3's

due Monday

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