DO NOW:

put your formal writeups in the folder...

take out ONLY the worksheet titled "Angular and Linear Speed"

Ali and Andrew: will you remind me at 9:20 to hand back your assessments?

Nov 7-5:50 PM

DO NOW:

in the packet titled "Angular and Linear Speed", do the ***Warm Up***

you have two minutes

Warm Up:

Formula for the **arc length** for circle with radius r and an angle of θ **which is given in degrees:**	Formula for the **area of a sector** for circle with radius r and an angle of θ **which is given in degrees:**
Formula for the **arc length** for circle with radius r and an angle of θ **which is given in radians:**	Formula for the **area of a sector** for circle with radius r and an angle of θ **which is given in radians:**

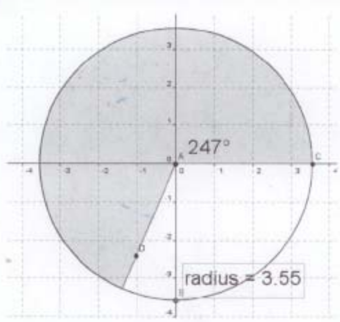
Nov 7-5:50 PM

Warm Up:

Formula for the **arc length** for circle with radius r and an angle of θ **which is given in degrees:** $\boxed{\frac{\theta^\circ}{360^\circ}} \cdot \underline{2\pi r}$	Formula for the **area of a sector** for circle with radius r and an angle of θ **which is given in degrees:** $\boxed{\frac{\theta^\circ}{360^\circ}} \cdot \underline{\pi r^2}$
Formula for the **arc length** for circle with radius r and an angle of θ **which is given in radians:** $\boxed{\frac{\theta^R}{2\pi}} \cdot \underline{2\pi r}$	Formula for the **area of a sector** for circle with radius r and an angle of θ **which is given in radians:** $\boxed{\frac{\theta^R}{2\pi}} \cdot \underline{\pi r^2}$

Nov 14-7:12 AM

6. (a) Find the *area* of the shaded piece of the circle (what we call a "sector"):



$\left(\frac{247^\circ}{360^\circ}\right)\pi(3.55)^2 \approx 27.16$ unit^2

(b) If you want to find the area of a sector of a circle with radius r and "subtends" (fancy way to say *traces out* or *goes through*) and angle of θ, what is the formula for that? Explain how you came up with this formula.

$\frac{\theta^\circ}{360^\circ} \cdot \pi r^2$

Nov 7-6:31 PM

7. You have a circle of radius 1. Find the arc length of the following degree measures exactly and approximately (round to the hundredths decimal place):

Degree measure	0°	30°	45°	60°	90°	180°	270°	360°
Arc length of a circle of radius 1 (exactly)	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	π	$3\pi/2$	2π
Arc length of a circle of radius 1 (approx)	0	0.52	0.79	1.05	1.57	3.14	4.71	6.28

There is something special about this chart. The magic word is: ***radian***

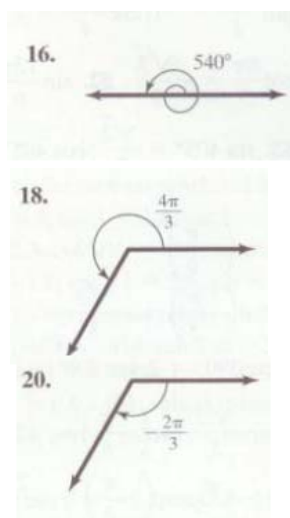
4

Nov 7-6:31 PM

6.1 Even solutions:

28. 98.38°
36. 2pi/3
44. -5pi/4
48. 150°
54. 75°
58. -135°

1) $\cancel{120}^\circ \cdot \frac{2\pi}{{}_3\cancel{360}^\circ}$

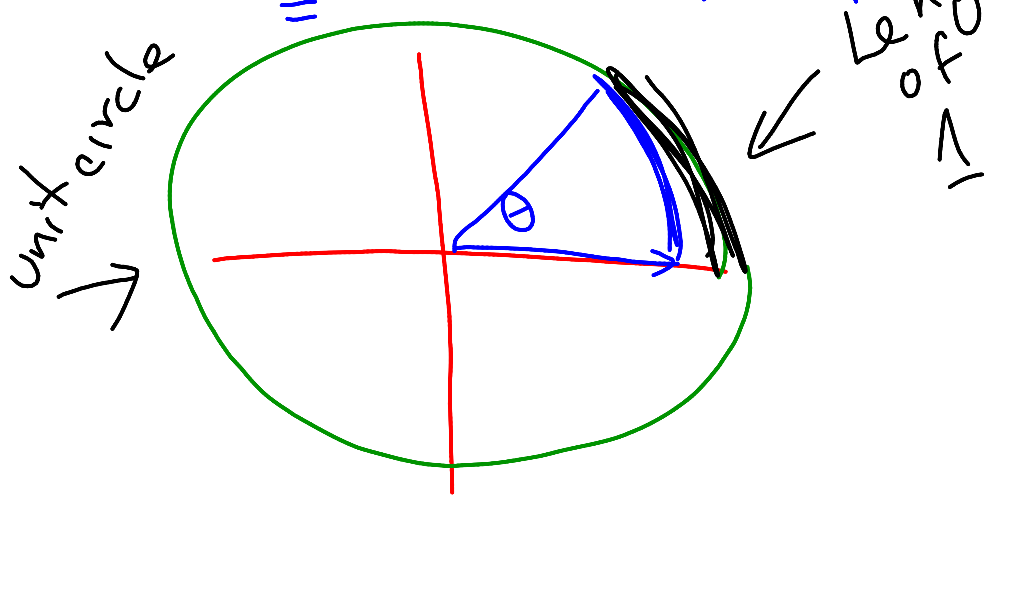


Nov 14-7:16 AM

WHAT ARE RADIANS?

Nov 14-7:40 AM

WHAT IS: 1 RADIAN? $\approx 57.29^\circ$



Nov 14-7:40 AM

READ ALOUD!

Nov 14-7:02 AM

If something is traveling at a constant speed, it travels a *set distance* in a *set time*. If you were running in a straight street, and you ran at a constant rate of 3 meters/second, then every second you run, you've traveled 3 meters.

Instead of running along a straight street, you should think about you running around a circular track, with radius r. We can now talk about *linear* speed and *angular* speed.

Linear speed is simply the $\dfrac{\text{the total distance traveled}}{\text{the total time taken to travel that distance}}$, and is just how "fast" the person is running in time.

Angular speed is simply the $\dfrac{\text{the total angle traversed}}{\text{the total time taken to traverse that angle}}$, and is just how "fast" the angle is changing in time.

If you're running at a *constant* linear speed around a circle, you are also running at a *constant* angular speed… and vice versa. In other words, you're going around the circle at a constant rate.

Nov 14-7:13 AM

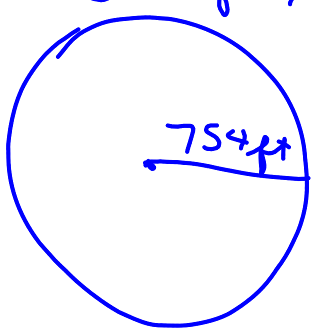
The *linear speed* of an object moving in a circle is denoted by v (for velocity). If s is the total distance traveled and t is the total time traveled, then: $v = \frac{s}{t}$	The *angular speed* of an object moving in a circle is denoted by ω (the greek letter omega). If θ is the angle traversed and t is the total time traveled, then: $\omega = \frac{\theta}{t}$

Nov 14-7:13 AM

1. If you are running at a constant speed around a circular track with radius 754 feet, and run three times around the track in 21 minutes.

(a) What is your linear speed?	(b) What is your angular speed?
$v = \frac{3(2\pi \cdot 754)}{21}$	$\omega_{deg} = \frac{3(360^\circ)}{21} \approx 51.4^\circ/\text{min}$

$\approx 676.8 \text{ ft/min}$



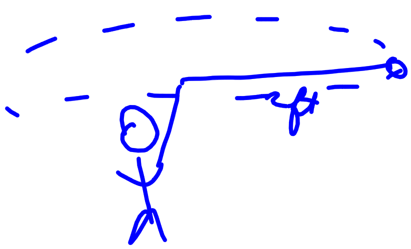
$\omega_{rad} = \frac{3(2\pi)}{21} \approx 0.89 \text{ rad/min}$

Nov 14-7:14 AM

2. [Example 8 from 6.1] A child is spinning a rock at the end of a 2-foot rope at the rate of 180 revolutions per minute (rpm). → 64, 800 deg/min

(a) What is the rock's linear speed?	(b) What is the rock's angular speed?
circumf. $V = \frac{s}{t} = \frac{2\pi(2)\cdot 180}{1}$ ≈ 2261.9 ft/min	$\omega_{deg} = \frac{\theta}{t} = \frac{180(360°)}{1}$ $\omega_{rad} = \frac{\theta}{t} = \frac{180(2\pi)}{1}$

≈ 1130.973 rad/min



Nov 14-7:14 AM

3. A child is spinning a rock at the end of a r-foot rope at the rate of 180 revolutions per minute (rpm).

(a) What is the rock's linear speed?	(b) What is the rock's angular speed?
$V = \frac{s}{t} = \frac{180\cdot(2\pi r)}{1}$ ft/min	$\omega_{deg} =$ $\omega_{rad}:$ SAME as 2b

$= 360\pi r$ ft/min

Nov 14-7:14 AM

4. Below are two statements. Determine whether they are true or false. Explain your answer.

T or F: the linear speed of an object moving around in a circle is dependent on the size of the circle.

T or F: the angular speed of an object moving around in a circle is dependent on the size of the circle.

2

Nov 14-7:15 AM

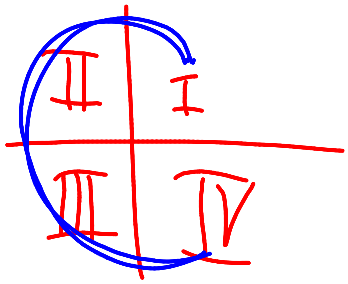
CREATING A UNIT CIRCLE

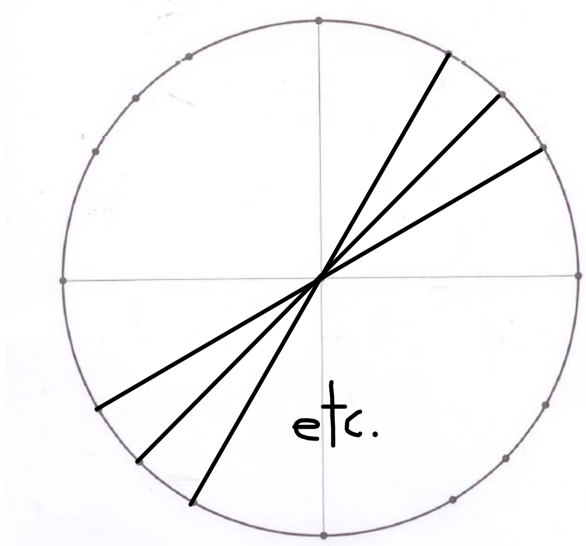
please follow all instructions!

Nov 14-7:20 AM

1. Use a ruler to connect opposite dots using a pencil

make sure these lines are drawn neatly and go through the origin





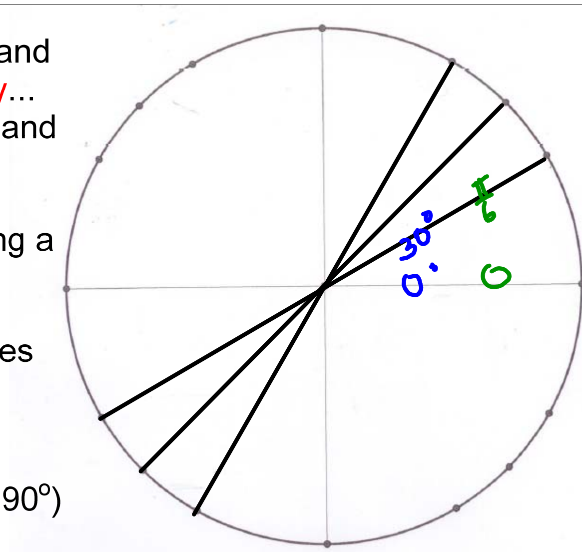
Nov 14-7:21 AM

Label all the angles in *degrees* and *radians* in the first quadrant only... use *different colors* for degrees and radians. BE NEAT!

Write the angles *on the line* using a colored pencil.

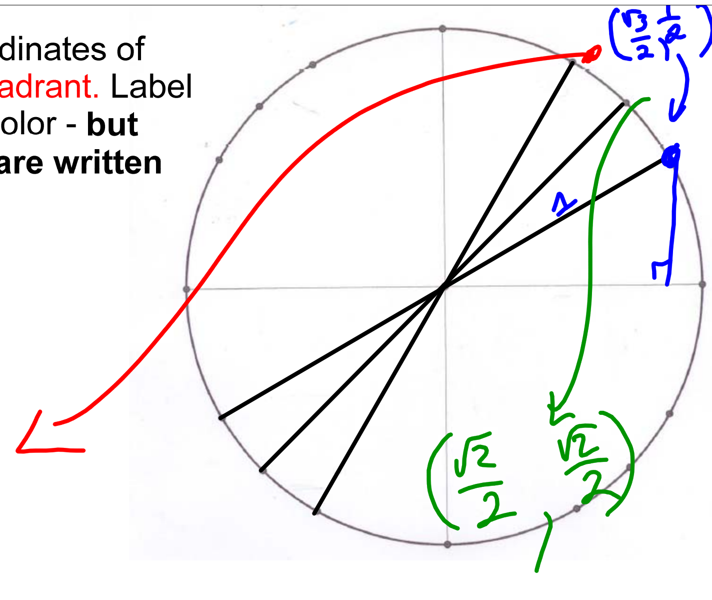
The dots are placed so the angles are the special right triangle angles...

30°, 45°, 60° (along with 0° and 90°)



Nov 14-7:21 AM

Now figure out the coordinates of the points in the first quadrant. Label them using a different color - **but make sure the points are written inside the circle.**

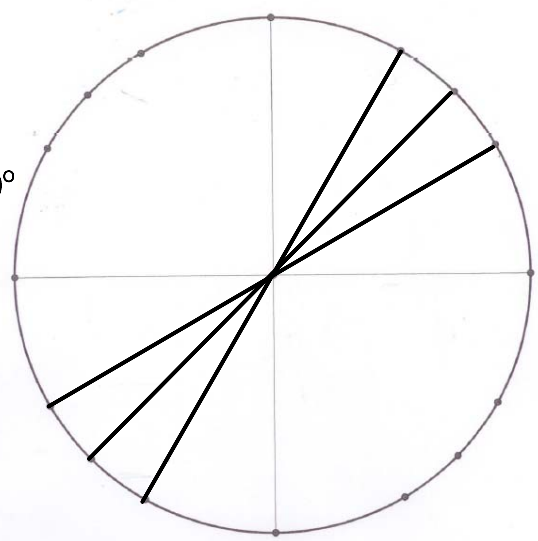


$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

Nov 14-7:21 AM

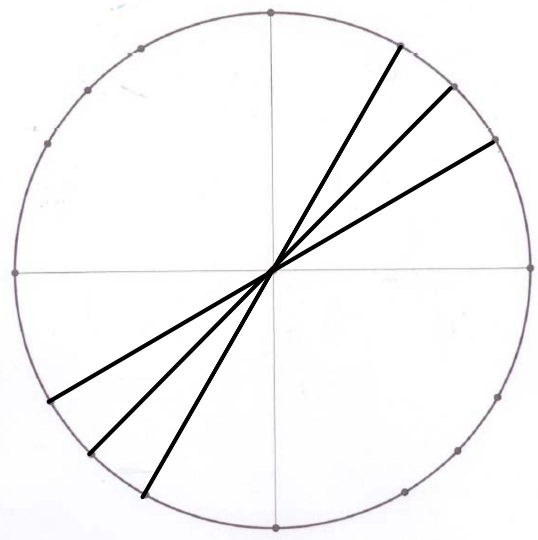
Now fill in the rest of the unit circle (angles, points) using symmetry arguments.

Have your angles be from 0^{o} to 360^{o} (or 0 to 2pi radians)



Nov 14-7:21 AM

LIGHTLY write your name on the back of your page and put it in the plastic folder.



Nov 14-7:21 AM

Home Enjoyment:

Section 6.1#71-89 (odd), 98, 99

Formal Writeup of Section 6.1#82, 84 (find the answer in degrees and radians), 92 (draw a picture!), 100, 105, 106

Remember to show and explain all your work/thought processes in the formal writeup.

Nov 14-7:32 AM

Nov 11-2:06 PM

Nov 11-1:38 PM