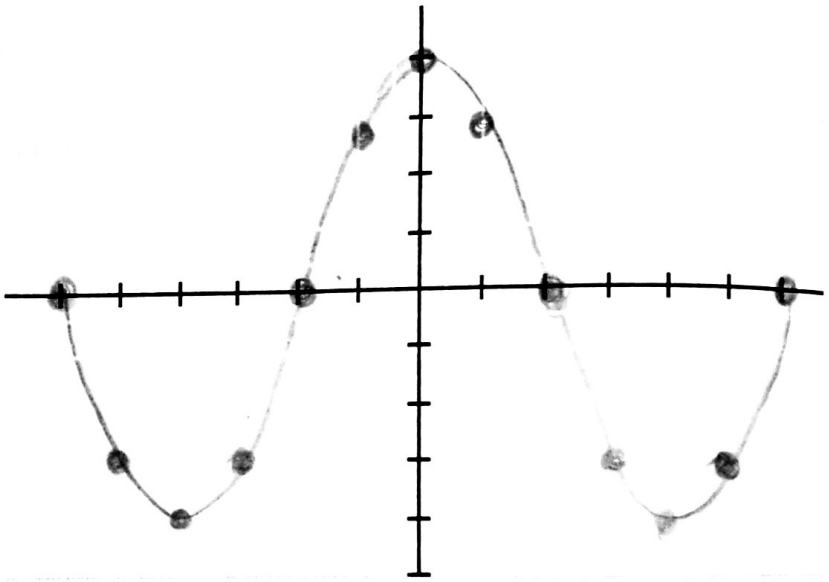
READY, SET, GO! Name Period Date

READY

Topic: Graphing a curve

1. Graph the table of values. Connect your points with a smooth curve.

x	*y*
-6	0
-5	-3
-4	-4
-3	-3
-2	0
-1	3
0	4
1	3
2	0
3	-3
4	-4
5	-3
6	0



2. Identify the maximum and minimum values of the curve. Max is 4
Min is -4

3. This curve repeats itself. (It's called a ***periodic function.***) Find the length of the interval that would allow you to see **exactly** one full length of the curve.
Completes one period (pattern) from $x=-6$ to $x=2$
∴ The length of the interval is 8

4. The curve is positive on the interval (-2, 2). Identify two more intervals where this curve will be positive. Ex. (-10, -6) and (6, 10)

SET

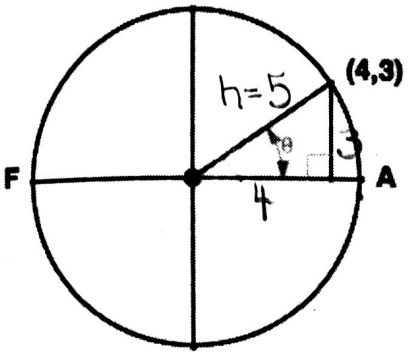
Topic: Finding values of sine in the coordinate plane

Use the given point on the circle to find the value of $sin\theta$. Then find the value of θ.

Recall $r = \sqrt{x^2 + y^2}$ and $sin\theta = \frac{y}{r}$.

Pythagorean thm.

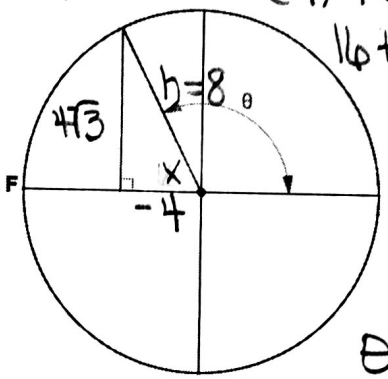
5.



$3^2+4^2=h^2$
$25=h^2$
$5=h$

$\sin\theta = \frac{3}{5}$
$\theta = 36.9°$

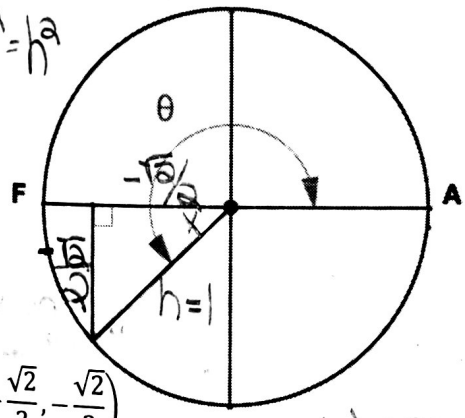
6. $(-4, 4\sqrt{3})$



$(-4)^2+(4\sqrt{3})^2=h^2$
$16+48=h^2$
$64=h$
$8=h$

$\sin X = \frac{4\sqrt{3}}{8}$
$X = 60°$
$\theta = 180° - 60°$
$= 120°$

7.



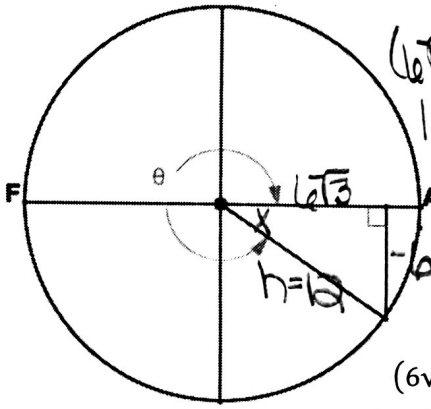
$\left(-\frac{\sqrt{2}}{2}\right)^2+\left(-\frac{\sqrt{2}}{2}\right)^2=h^2$
$1=h^2$
$1=h$

$\sin X = -\frac{\sqrt{2}}{2}$
$*X = -45°$
$\theta = 180° + 45°$
$= 225°$

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

* Neg. ∠ because below x-axis

8.



$(6\sqrt{3})^2+(-6)^2=h^2$
$108+36=h^2$
$144=h^2$
$12=h$

$\sin X = \frac{-6}{12}$
$X = -30°$
$\theta = 360° - 30° = 330°$

$(6\sqrt{3}, -6)$

9. In each graph above, the angle of rotation is indicated by an arc and θ. Describe the angles of rotation that make the y-values of the points positive and the angles of rotation that make the y-values negative.

- The y-values of the points are positive when the angle of rotation is $0° < \theta < 180°$
- The y-values of the points are negative when the angle of rotation is $180° < \theta < 360°$

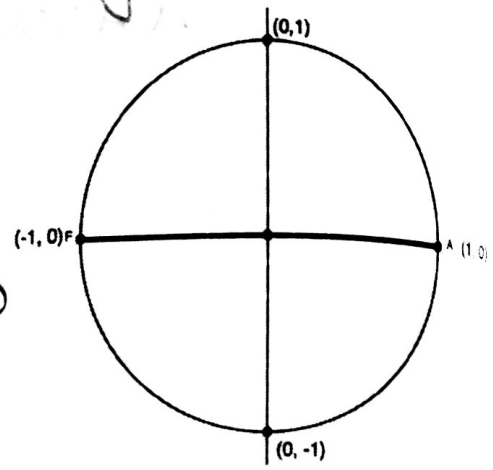
10. What do you notice about the y-values and the value of sine in the graphs above?

They have the same sign (i.e. they are both positive or both negative)

11. In the graph at the right, the radius of the circle is 1 unit. The intersections of the circle and the axes are labeled. Based on your observation in #10, what do you think the value of sine might be for the following values of θ:

$\sin\theta = \frac{y}{r}$ $\sin\theta = \frac{y}{r}$ $\sin\theta = y$

90°? 1 180°? 0 270°? −1 360°? 0

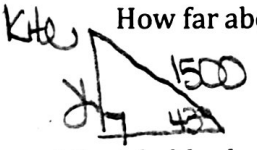


GO

Topic: Solving problems using right angle trigonometry

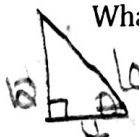
Make a sketch of the following problems, then solve.

12. A kite is aloft at the end of a 1500 foot string. The string makes an angle of 43° with the ground. How far above the ground is the kite? (Round your answer to the nearest foot.)



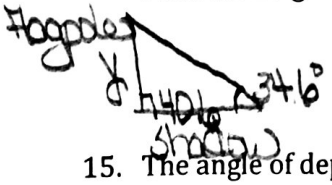
$\sin 43° = \frac{y}{1500}$ $1500 \sin 43° = y$ $1023 = y$

13. A ladder leans against a building. The top of the ladder reaches a point on the building that is 12 feet above the ground. The foot of the ladder is 4 feet from the building. Find to the nearest degree the measure of the angle that the ladder makes with the level ground. What is the angle the ladder makes with the building?



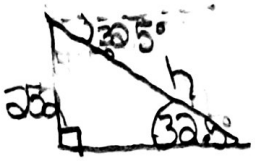
$\tan\theta = \frac{12}{4}$ $\theta = \tan^{-1}\left(\frac{12}{4}\right)$ $\theta = 71.57°$

14. The shadow of a flagpole is 40.6 meters long when the angle of elevation of the sun is 34.6°. Find the height of the flagpole.



$\tan 34.6° = \frac{y}{40.6}$ $40.6 \tan 34.6° = y$ $28\text{ m} = y$

15. The angle of depression from the top of a building to a car parked in the parking lot is 32.5°. How far from the top of the building is the car on the ground, if the building is 252 meters high?



$\sin 32.5° = \frac{252}{h}$ $h \sin 32.5° = 252$ $h = \frac{252}{\sin 32.5°}$

$h = 469\text{ m}$