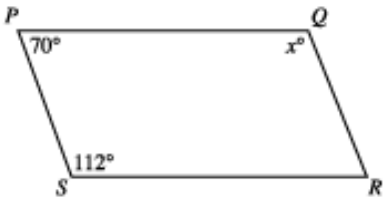
Questions on 6.3 HW? Work on the problems below as a little ACT prep...

9. In quadrilateral *PQRS* below, sides $\overline{PS}$ and $\overline{QR}$ are parallel for what value of *x* ?



A. 158

B. 132

C. 120

D. 110

E. 70

8. The length, in inches, of a box is 3 inches less than twice its width, in inches. Which of the following gives the length, *l* inches, in terms of the width, *w* inches, of the box?

F. $l = \frac{1}{2}w + 3$

G. $l = w + 3$

H. $l = w - 3$

I. $l = 2w + 3$

J. $l = 2w - 3$

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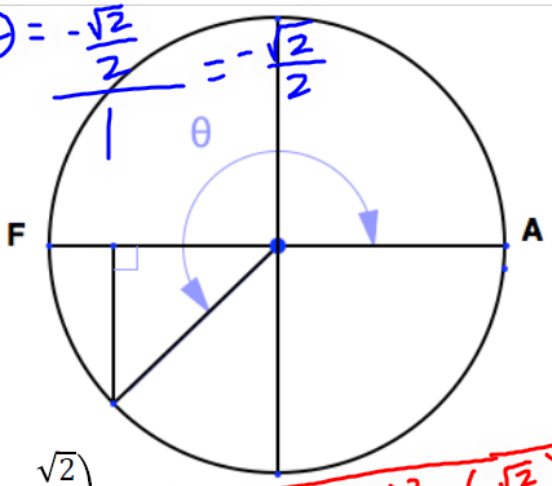
7.

$\sin\theta = \frac{-\frac{\sqrt{2}}{2}}{1} = -\frac{\sqrt{2}}{2}$

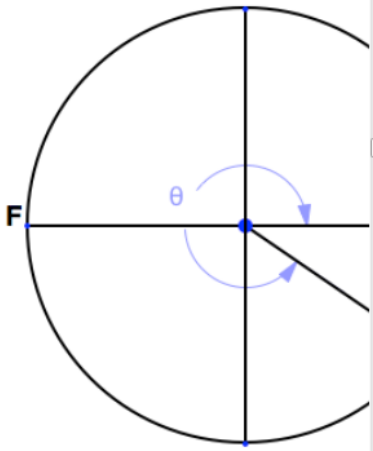


$\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

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

$r = \sqrt{\frac{2}{4} + \frac{2}{4}} = \sqrt{1} = 1$

8.



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

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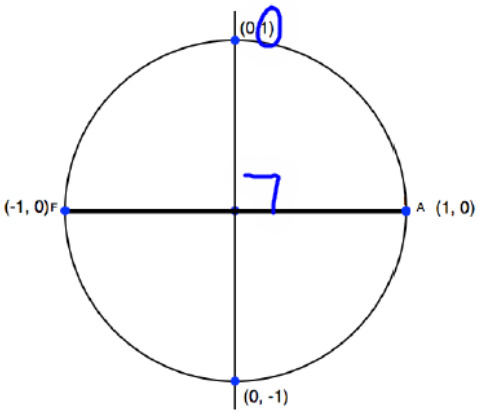
11. In the graph at the right, the radius of the circle is 1. The intersections of the circle and the axes are labeled. Based on your observation in #6, what do you think the value of sine might be for



90°? 180°? 270°? 360°?

1

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 string that is 1500 feet long. The string makes an angle of 43º with the ground. How far above the ground is the kite? (Round your answer to the nearest foot.)

13. A ladder leans against a building. The top of the ladder reaches a point on the building that is

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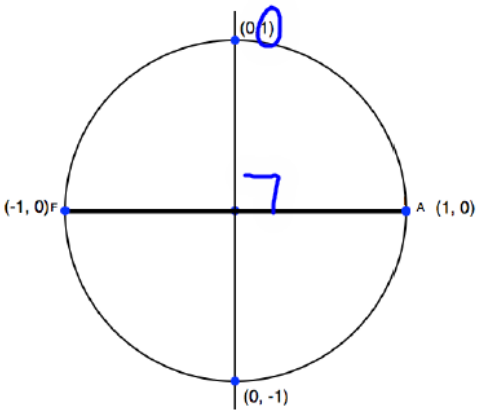
11. In the graph at the right, the radius of the circle is 1. The intersections of the circle and the axes are labeled. Based on your observation in #6, what do you think the value of sine might be for



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8.50 x 11.00 in

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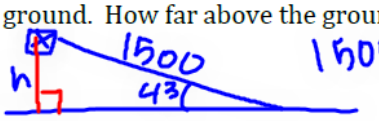
12. A kite is aloft at the end of a string that is 1500 feet long. The string makes an angle of 43º with the ground. How far above the ground is the kite? (Round your answer to the nearest foot.)



$1500 \cdot \sin 43 = \frac{h}{1500} \cdot 1500$

$1023\text{ft} = h$

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?

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

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

8.50 x 11.00 in

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6.4 More Ferris Wheels

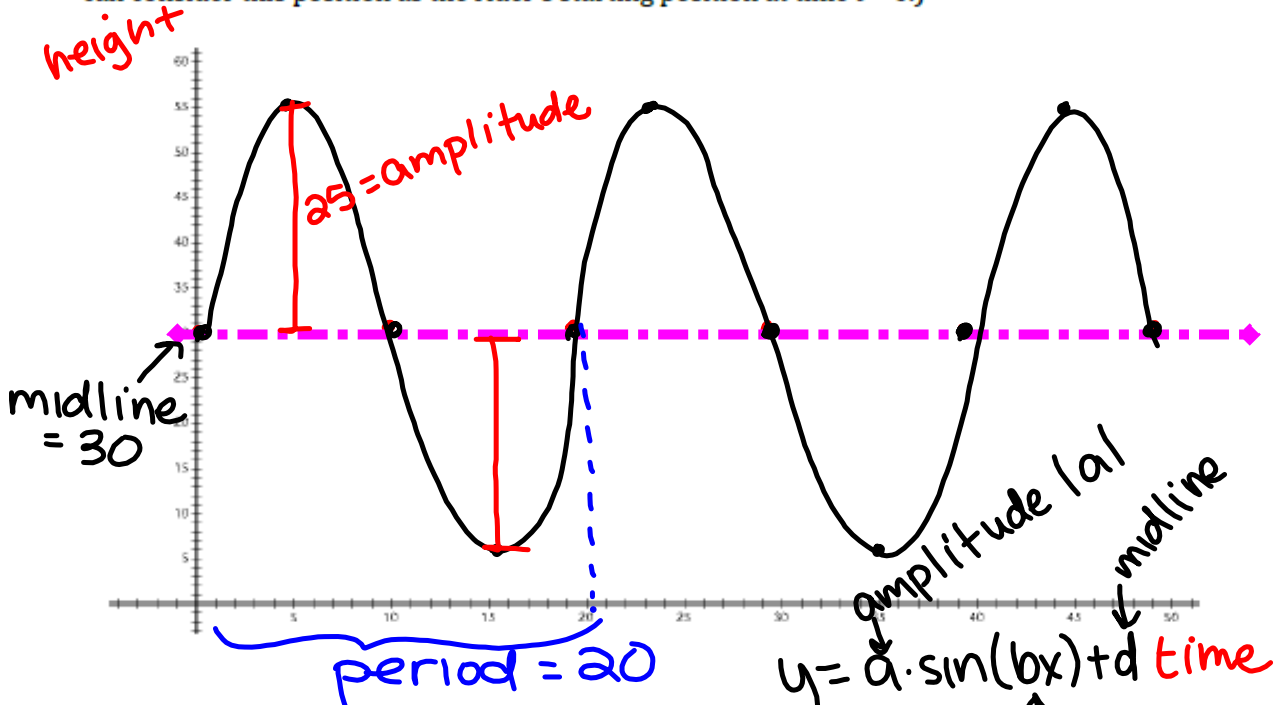
A Solidify Understanding Task

In a previous task, *"Sine" Language*, you calculated the height of a rider on a Ferris wheel at different times t, where t represented the elapsed time after the rider passed the position farthest to the right on the Ferris wheel.

Recall the following facts for the Ferris wheel in the previous tasks:

- The Ferris wheel has a radius of 25 feet
- The center of the Ferris wheel is 30 feet above the ground
- The Ferris wheel makes one complete rotation counterclockwise every 20 seconds

1. Based on the data you calculated, as well as any additional insights you might have about riding on Ferris wheels, sketch a graph of the height of a rider on this Ferris wheel as a function of the time elapsed since the rider passed the position farthest to the right on the Ferris wheel. (We can consider this position as the rider's starting position at time $t = 0$.)



2. Write the equation of the graph you sketched in question 1.

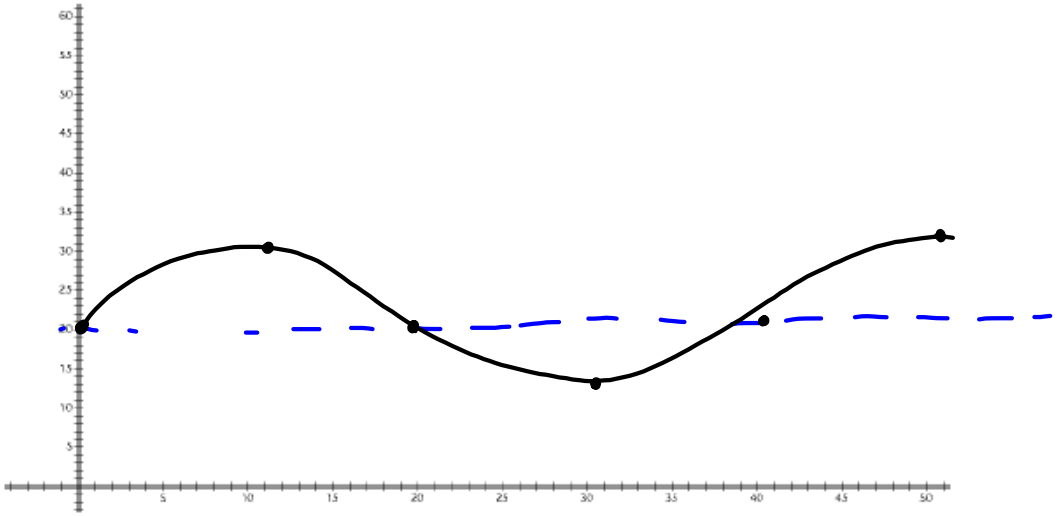
$h(t) = 30 + 25\sin(18t)$

30 = center height; 25 = radius; $18 = \frac{360°}{20\text{ sec}}$; t = time

3. Of course, Ferris wheels do not all have this same radius, center height, or time of rotation. Describe a different Ferris wheel by changing some of the facts listed above. For example, you can change the radius of the wheel, or the height of the center, or the amount of time it takes to complete one rotation. You can even change the direction of rotation from counterclockwise to clockwise. If you want, you can change more that one fact. Just make sure your description seems reasonable for the motion of a Ferris wheel.

Description of my Ferris wheel: radius = 10 (amplitude)
center height = 20 (midline)
rotation time: 40 sec ($b = \frac{360}{40} = 9°$)

4. Sketch a graph of the height of a rider on your Ferris wheel as a function of the time elapsed since the rider passed the position farthest to the right on the Ferris wheel.



5. Write the equation of the graph you sketched in question 4.

$h(t) = 20 + 10\sin(9t)$

6. We began this task by considering the graph of the height of a rider on a Ferris wheel with a radius of 25 feet and center 30 feet off the ground, which makes one revolution counterclockwise every 20 seconds. How would your graph change if:

- the radius of the wheel was larger or smaller? changes amplitude & max/min
- the height of the center of the wheel was greater or smaller? moves graph ↑ or ↓
- the wheel rotates faster or slower? changes period
  faster: ∧∧∧
  slower: ∿

7.
- radius ...
  - changes a
- height
  - changes d
- rotation
  - changes b

from $y = a\sin(bx) + d$

7. How does the equation of the rider's height change if:

   - the radius of the wheel is larger or smaller?
   - the height of the center of the wheel is greater or smaller?
   - the wheel rotates faster or slower?

8. Write the equation of the height of a rider on each of the following Ferris wheels t seconds after the rider passes the farthest right position.

   a. The radius of the wheel is 30 feet, the center of the wheel is 45 feet above the ground, and the angular speed of the wheel is 15 degrees per second counterclockwise.

   b. The radius of the wheel is 50 feet, the center of the wheel is at ground level (you spend half of your time below ground), and the wheel makes one revolution *clockwise* every 15 seconds.

Homework

Finish 6.4 "Ready, Set, Go"

Mar 28-11:26 AM