In Right Triangle Trigonometry explain why SinA **must** be less than 1.

Since SinA is defined as $\frac{\text{Opposite Leg}}{\text{Hypotenuse}}$

this ratio will always be less than one because the hypotenuse is always bigger than any leg.

Similar reasoning can be used to show that CosA < 1

How big/small can TanA be?

Since TanA is defined as $\frac{\text{Opposite Leg}}{\text{Adjacent Leg}}$

- TanA can be >1 because the Opposite leg could be bigger than the Adjacent leg.
- TanA can be <1 because the Opposite leg could be shorter than the Adjacent leg.
- TanA can be =1 because the Opposite leg could be equal to the Adjacent leg.

In right triangle trigonometry:

Can Sin, Cos, or Tan be equal to zero?

the only way a ratio can equal zero is if the numerator is zero. But the numerator represents the length of a side in a right triangle. And sides of a triangle can't be equal to zero. Thus, Sin, Cos, and Tan will never equal zero.

Can Sin, Cos, or Tan be negative?

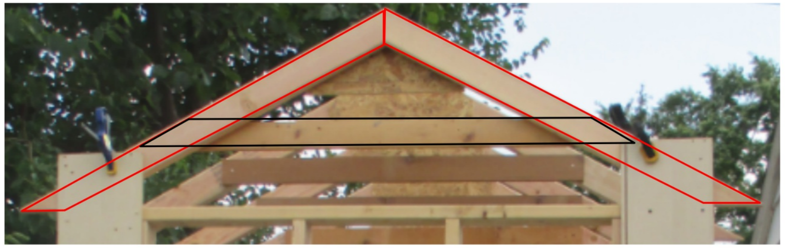
the only way a ratio can be negative is if one of the two numbers is negative. But, since these numbers represent the side lengths of a triangle they will both always be positive. Thus, Sin, Cos, and Tan will always be positive.

Using other definitions of Sin, Cos, and Tan (not right triangle trigonometry), All of these functions:

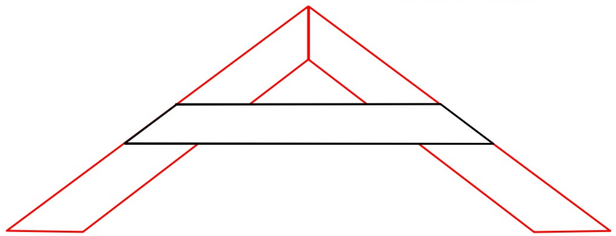
- Can equal 1
- Can equal zero
- Can be negative

When could you use trigonometry in "real-life"?

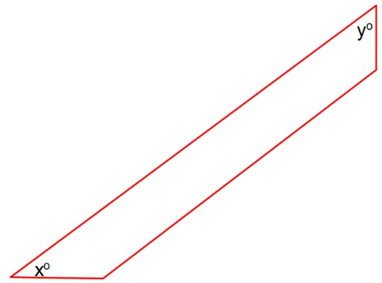
To design and build a shed like this one you'll need to know how to calculate angles and lengths so that boards are cut properly in order to fit together correctly.



Roof Truss



In order to cut these pieces to the right length and with the right angles I had to use Trigonometry.



Find angles x and y to the nearest whole degree.

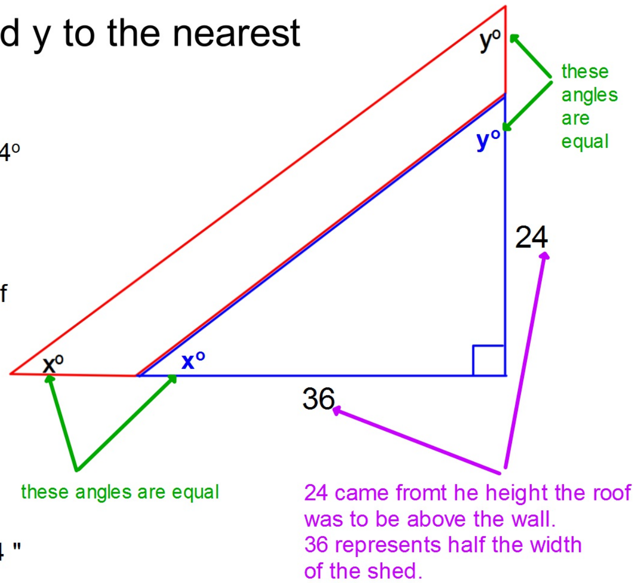
Angle x: $\tan^{-1}(24/36) = 34^\circ$

Angle y: $90^\circ - 34^\circ = 56^\circ$

I also needed the length of the hypotenuse in the blue triangle which gave me the length of the red board.

$hyp^2 = 36^2 + 24^2$

hyp = 43.27 in
which is about 43 1/4 "



Sec 13-1: Periodic Functions

What does it mean if something is Periodic?

Merriam-Webster SINCE 1828

Definition of PERIODIC

1 a : occurring or recurring at regular intervals

b : occurring repeatedly from time to time

2 a : consisting of or containing a series of repeated stages, processes, or digits : CYCLIC • *periodic* decimals • a *periodic* vibration

b : being a function any value of which recurs at regular intervals

Section 13-1: Periodic Functions

What you should be able to do after this section:

- Tell if a function is periodic or not.
- Identify a cycle
- Find the following of periodic functions:
  - Period
  - Amplitude
  - Equation of the Midline(Axis)

Periodic function: A repeating pattern of y-values at regular intervals.

Cycle: One complete pattern.
The smallest portion of the function that could be translated left and right to create the entire function.

Period: The width of one cycle (x-values)

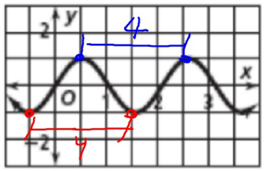
Midline (also called the Axis):
The horizontal line that passes through the middle of the graph.

Equations will be: y =

Amplitude:
The vertical distance from the midline to either the maximum or the minimum. y-values
OR
Half the total height of the periodic function

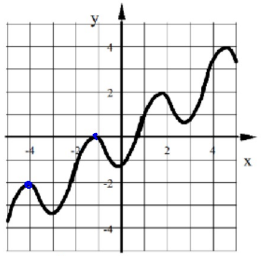
1. Is each of the below a periodic function? If no, explain why.

a.



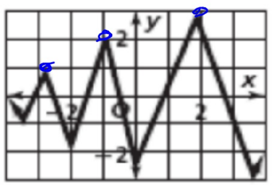
Yes, y-values repeat every 4 units

b.



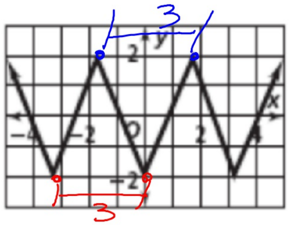
NO, y-values don't repeat

c.



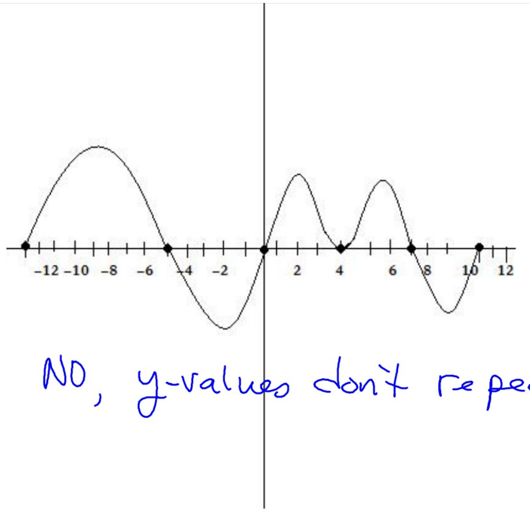
No, y-values don't repeat

d.



Yes, y-values repeat every 3 units

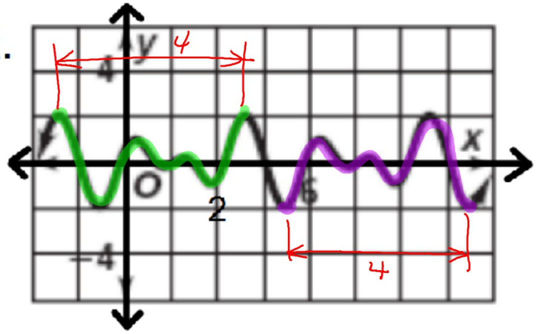
e.



NO, y-values don't repeat

2. Highlight one cycle of each periodic function and find it's period.

a.



Both of the highlighted sections could be considered a cycle. They both are 4 units wide. Therefore, the

Period = 4