Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 1 - 8 Topic: No homework over break :)	0 1 2	
Tuesday Date: _____ Topic: _____	0 1 2	
Wednesday Date: _____ Topic: _____	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Warm-up:

What do you know about Ferris wheels?

Class Plan:

1. Warm-up
2. Introduce Investigation

Consider questions to be answered

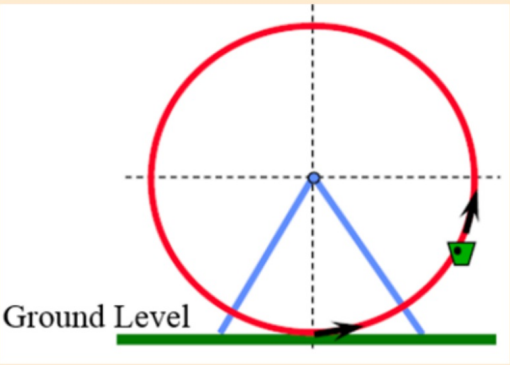
3. Ferris wheel Investigation
4. Exercises: Unit circle table
5. Mathematician...Tuesday!

Islamic Golden Age of science

Narrator: Neal Degrasse Tyson

(From **"Cosmos"** series)

Scenario: One of the largest Ferris wheels is approximately 500 feet in diameter. The wheel is designed to turn continuously and to be slow enough for people to hop on and off while it turns. The Ferris wheel is shown below.

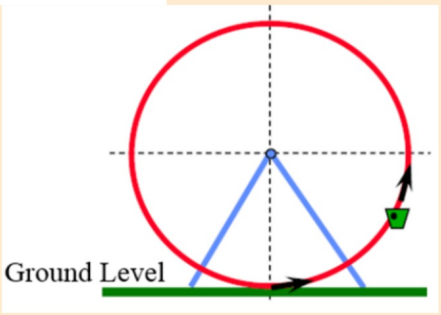


Begin your investigation by writing down questions that could be asked of this scenario.

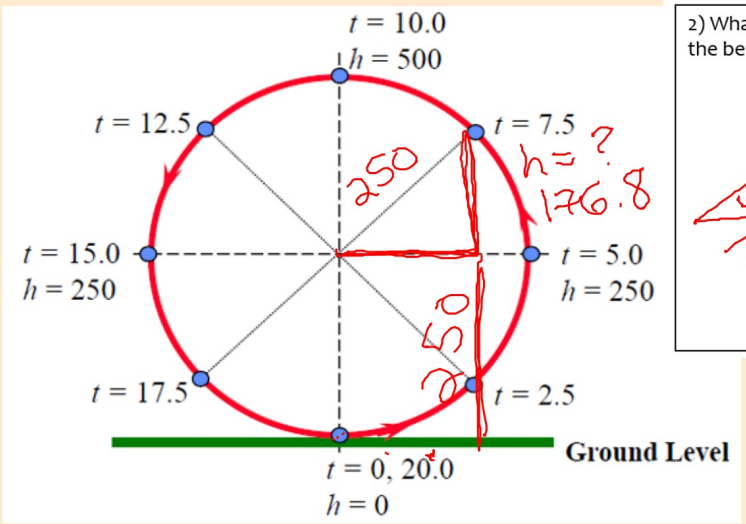
Share out

1) What questions could be asked about this scenario?

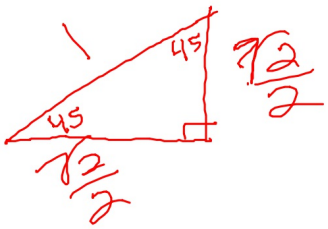
- WHAT IS THE HIGHEST POINT? (MAX HEIGHT)
- HOW LONG DOES IT TAKE TO GET TO THE TOP?
- HOW LONG DOES IT TAKE TO DO A FULL ROTATION?
- HOW FAST IS IT!?



The operator of the Ferris wheel collected the following data over a period of time.



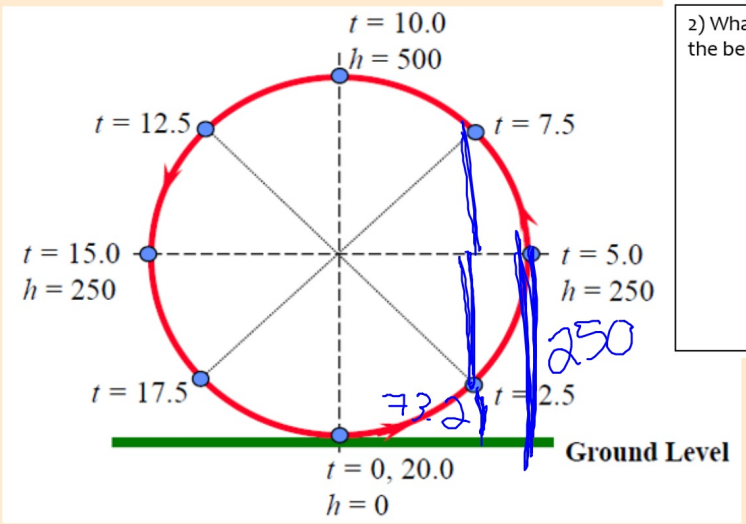
2) What patterns do you notice in the behavior of the ferris wheel?



$\frac{360}{8} = 45°$

How can we solve for the unknown heights?

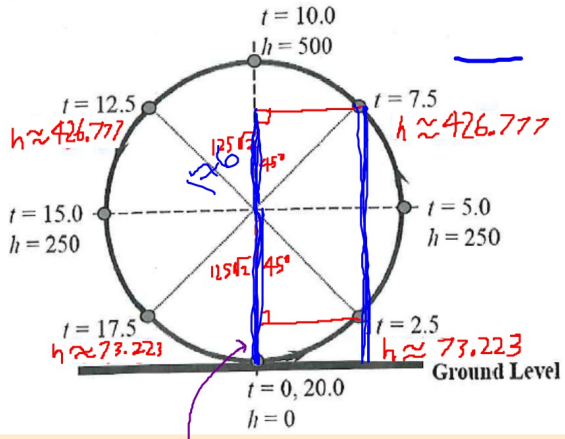
The operator of the Ferris wheel collected the following data over a period of time.



2) What patterns do you notice in the behavior of the ferris wheel?

How can we solve for the unknown heights?

The operator of the Ferris wheel collected the following data over a period of time.



2) What patterns do you notice in the behavior of the ferris wheel?

- Time increases
- Height increases, then decreases

$250 - 125\sqrt{2} \approx 73.223$

$250 + 125\sqrt{2} \approx 426.777$

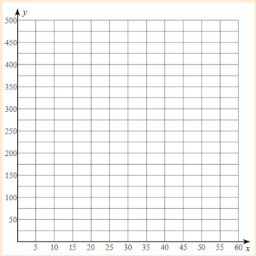
Ferris wheel Investigation

Do:

1) Complete table, predict last columns!

Time, t (min)	0	2.5	5	7.5	10	12.5	15	17.5	20				
Height, h (feet)													

2) Graph table.

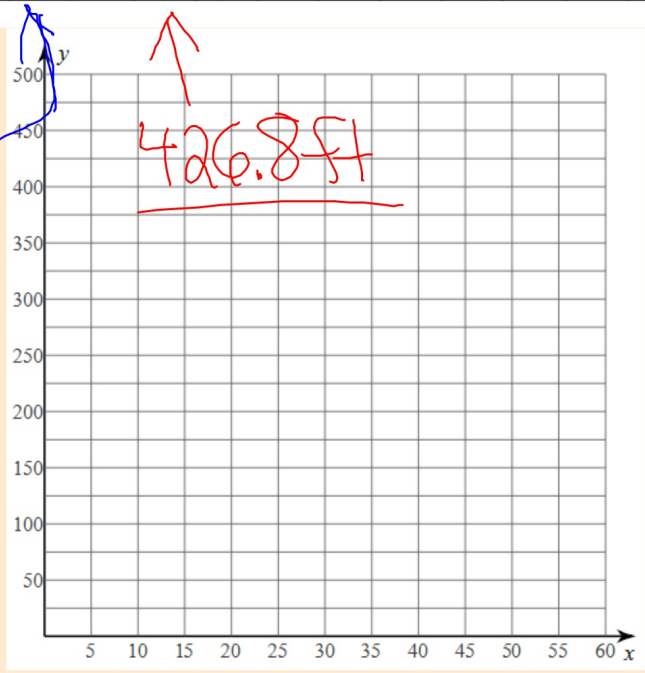


3) Observe patterns.

4) Answer observation questions.

5) Done? Help others! & Calculate speed in miles per hour

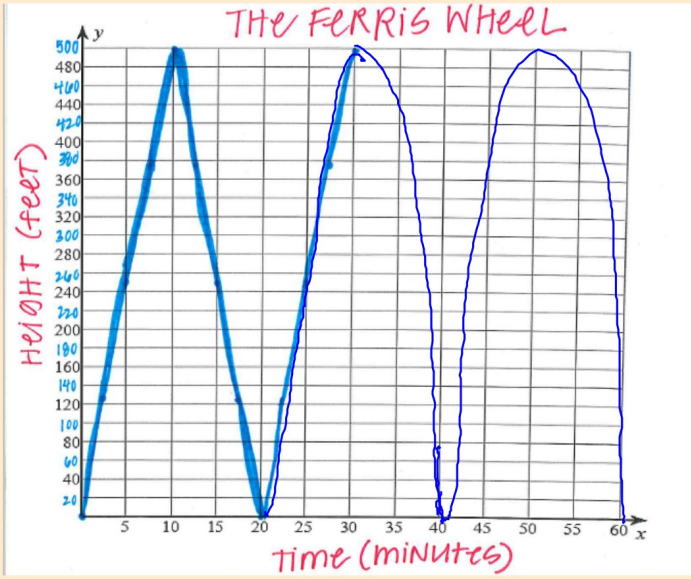
Time, **t** (min)	0	2.5	5	7.5	10	12.5	15	17.5	20				
Height, **h** (feet)	0	73.2	250	426.8	500				0				



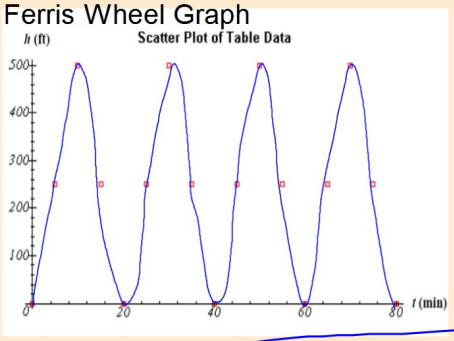
73.2

426.8ft

Time, **t** (min)	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30
Height, **h** (feet)	0	73.2	250	426.8	500	426.8	250	73.2	0	73.2	250	426.8	500



Ferris Wheel Graph



Observations??

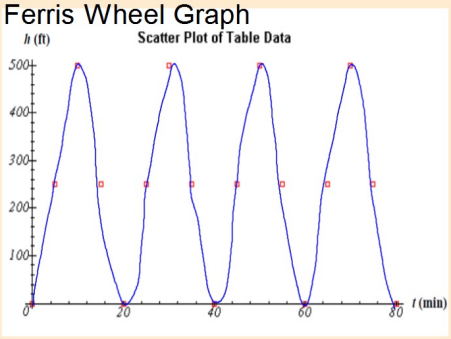
• What would be a good description of the shape of the graph if the data points were connected with a smooth curve?

Parabolas

Observations?? Periodic Functions

- What natural phenomena have this shape? light, wave length, mountain, rockets, camel
- What characteristics will we be interested in? Sound, temperature, day/night

Ferris Wheel Graph



Observations??

• What would be a good description of the shape of the graph if the data points were connected with a smooth curve?

Waves

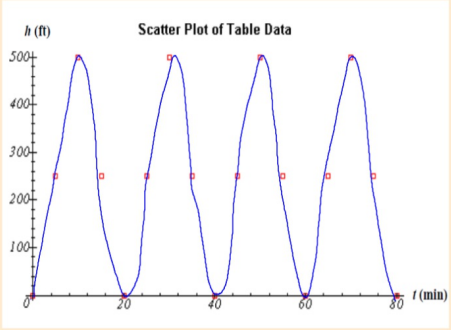
Observations??

- What natural phenomena have this shape? seismograph

  Sound waves, heartbeat, wheels,
- What characteristics will we be interested in?

  The middle, time to repeat,

  in other quadrants?



Observations??

- What would be a good description of the shape of the graph if the data points were connected with a smooth curve?

MINE doesn't look as smooth!

wave

- What natural phenomena have this shape?

music
bikes, SOUNDwaves, water, ♡ beats
emotions, time

- What characteristics will we be interested in?

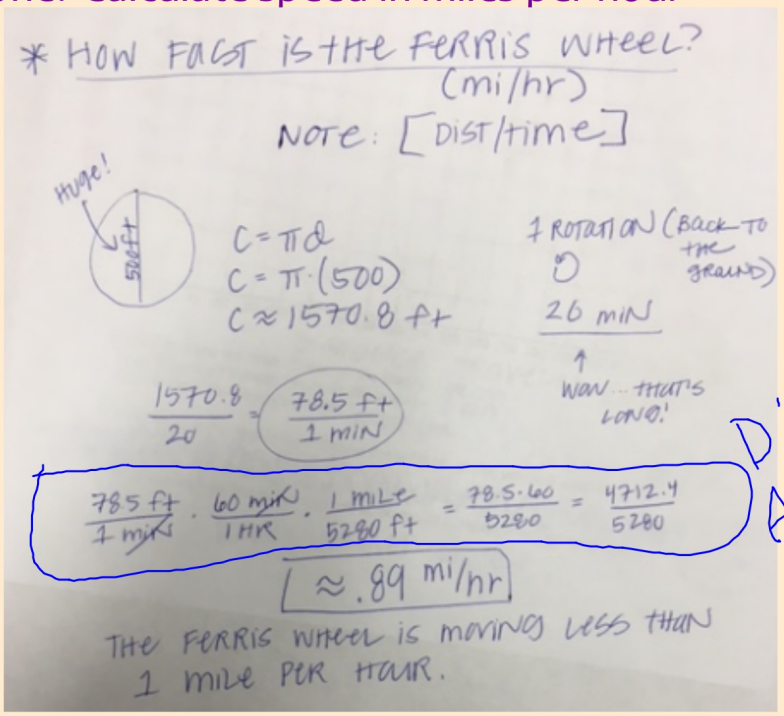
time OF FULL period, max, min

Natural Phenomena that behaves in this manner....

Light

Periodic

5) Done? Calculate speed in miles per hour



Exercises: Use your unit circle to complete the table.
(**Challenge:** cot, sec, csc) Rationalize denominators!

HOLD ONTO THIS TABLE FOR FUTURE REFERENCE!

Angle Measure	SINE	COSINE	TANGENT
0° 360°	0	1	0/1 = 0
30°	.5	.866	.577
45°	.707	.707	1
60°	.866	.5	1.732
90°	1	0	Und
120°			
135°	.707	-.707	-1
150°			
180°	0	-1	0
210°			
225°	-.707	-.707	1
240°			
270°	-1	0	Und
300°			
315°			
330°			

$\frac{\sqrt{3}}{2} \approx .866$

$\frac{1}{2} = .5$

$\frac{\sqrt{2}}{2} \approx .707$

(x, y) = (cosθ, sinθ)

Unit circle with coordinates on next page!

$\tan = \frac{\sin}{\cos}$

(0, -1)

(cos, sin)

Unit circle with coordinates