How was your 3-day weekend?!?

Tuesday Date: 1 - 16 Topic: Quiz Review	
Wednesday Date: 1 - 17 Topic: 4.2 Partner Quiz	
Thursday Date: 1 - 18 Topic: Semester Review	
Friday Date: 1 - 19 Topic: Semester Review	

Agenda for the week

No monitoring page - homework is to review for unit test and final :)

/ Finals

(23) 1, 2, 3, 4.

(24) 1, 5, 6, 7

Tuesday, January 23, 2018

- Four Period day.
- Lunch with period 3 teacher.
- One hour, 25 minute classes

Period 1: Study Hall	8:05-9:30
Period 2	9:40-11:05
Period 3	11:15-1:10*
**Lunch to be determined*	
Period 4	1:20-2:45

Wednesday, January 24, 2018

- Four Period day.
- Lunch with period 6 teacher.
- One hour, 25 minute classes

Period 1: Finals	8:05-9:30
Period 5	9:40-11:05
Period 6	11:15-1:10*
**Lunch to be determined*	
Period 7	1:20-2:45

On the day of the final:

1) Unit 4 test (Re-assess radicals and special right triangles)
2) Multiple Choice final (Questions from unit 1, 2, 3, and 4)

<u>Warm-up:</u> Predict which city recieves more hours of daylight per year. (not considering weather patterns)

Why?

Fairbanks, AK

Miami, FL

Do: Choose task AK or FL for you and your partner.

Use the rubric to ensure you are meeting all criteria!

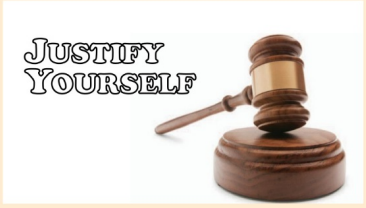
3 4	The student is able to: i. Apply mathematical problem-solving techniques to discover simple patterns. ii. Suggest general rules consistent with findings.			• Data is plotted on a graph with labels and titles. • An equation is written. • Work is shown to generate the equation model. • There is an **attempt to verify** the equation algebraically using values from original data set.
5 6	The student is able to i. Select and apply mathematical problem-solving techniques to discover complex patterns. ii. Describe patterns as general rules consistent with findings. iii. Verify the validity of these general rules.			• Data is plotted on an accurately scaled graph with labels and titles. • A **valid** periodic equation is written. • Sufficient work is shown to generate the equation model. • The equation is **verified** algebraically using values from original data set. • There is an **attempt** to **justify** the model.
7 8	The student is able to: i. Select and apply mathematical problem-solving techniques to discover complex patterns. ii. Describe patterns as general rules consistent with correct findings. iii. Verify and justify, these general rules.			• Data is plotted on an accurately scaled graph with labels and titles. • A **correct** periodic equation is written. • Sufficient work is shown to generate the equation model. • The equation is **verified** algebraically using values from original data set. • Evidence is provided to defend (**justify**) why the equation accurately fits the data.

Verify and justify our equation model

Verification:

"Demonstrate that (something) is true, accurate...."

- Choose a data pair from given data. Show algebraically how closely the equation predicts the actual data.



Justification:

"...Prove to be right or reasonable."

- Give evidence from the data table and/or graph that supports the ***a, b, c*** in your equation.

Do: Choose AK or FL for you & your partner.
Create a model for the hours of daylight.

Fairbanks, AK

Miami, FL

Use the rubric to ensure you are meeting all criteria!

3 4	The student is able to: i. Apply mathematical problem-solving techniques to discover simple patterns. ii. Suggest general rules consistent with findings.		• Data is plotted on a graph with labels and titles. • An equation is written. • Work is shown to generate the equation model. • There is an **attempt to verify** the equation algebraically using values from original data set.
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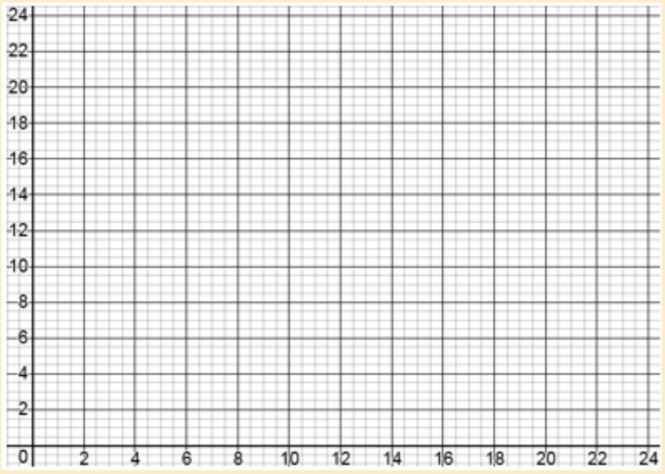
Done?
Study for assessment tomorrow.

Miami, FL

Month	Daylight (hours)
0	12.5
1	13
2	13.75
3	14
4	13.5
5	12.75
6	12
7	11.25
8	10.75
9	10.5
10	11
11	11.75
12	12.5
13	13.25
14	13.75
15	14
16	13.5
17	12.75
18	12
19	11.25
20	10.75
21	10.5
22	11
23	11.5



2. From the data and graph identify the:

Maximum _____ **Minimum** _____

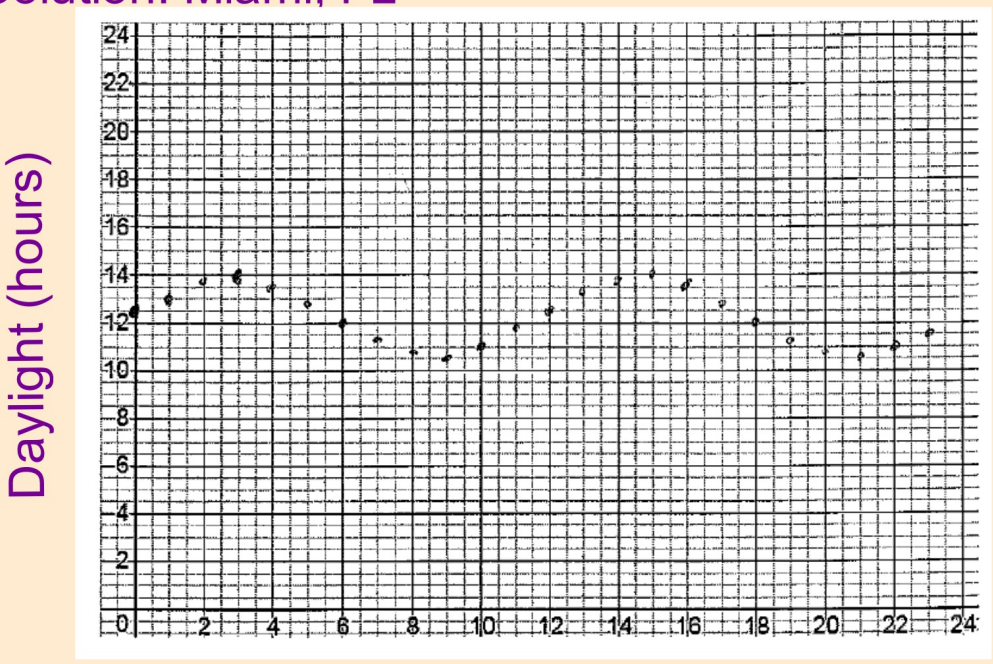
Principal Axis: Y = _____ **Amplitude** _____

Period _____

$y = \sin bx$, $b \neq 0$, b affects the period and the period is $\frac{360°}{|b|}$.

Equation

Solution: Miami, FL



Solution: Miami, FL

2. From the data and graph identify the:

Maximum 14 **Minimum** 10.5

Principal Axis: Y = 12.25 **Amplitude** 1.75

Period 12 months

3. Write a periodic equation that will model the data. $y = 1.75 \sin(30x) + 12.25$

The graph is a sine graph because the y-axis is near the principal axis of 12.5 hours.

Solution: Miami, FL

4. Use the information from (#2) to find the total number of daylight hours in one year for your city.

There are a number of ways to come up with an estimate for this. One is to recognize that the principal axis gives the average daily hours of sunlight throughout the year.

$365 \cdot 12.25 = \boxed{4471.25 \text{ hours}}$

5. Verify your equation algebraically.

Month 8 (Actual 10.75 hours)

$y = 1.75 \sin(30 \cdot 8) + 12.25$

$y = 1.75 \sin(240) + 12.25$

$y = 1.75(-.866) + 12.25$

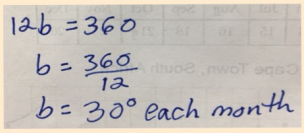
$\boxed{y \approx 10.73 \text{ hours}}$

Model is accurate since 10.73 hours is only 2 hundreths of an hour away from the actual time!

Solution: Miami, FL **y = 1.75sin(30t) + 12.25**

6. Justify the parts of your equation model

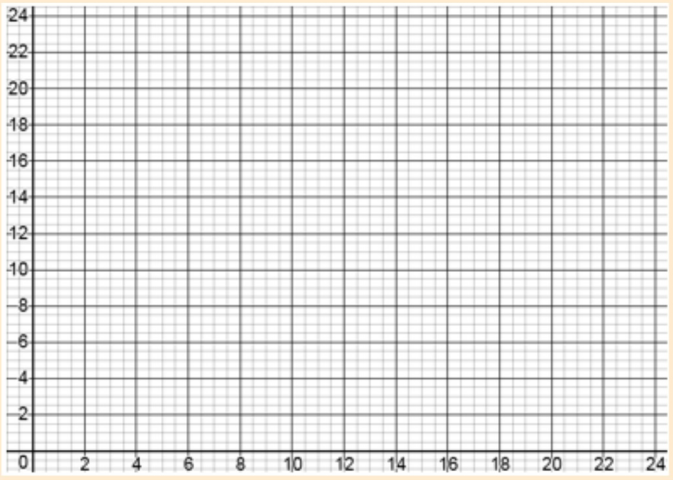
- **a= 1.75** The data shows the max as 14 hours of day light and min as 10.5 hours. This shows the distance between the ***max*** and principal axis ***and*** the distance between the ***min*** and principal axis is about 1.75.
- **b=30** I noticed the wave crossed the y-axis at about 12.5, and this number of hours began to repeat itself after 12 months. This shows the cycle of hours of daylight begin to repeat after 12 months, so the period is 12 months.
- **30** waves of 12 months in 360 degrees.
- Period = 360/**b**, so 12 = 360/**b**.



- **c=12.25** The mean between the min/max is 12.25, so the mean line (*principal axis*) is at y = 12.25.

Fairbanks, AK

Month	Daylight (hours)
0	14
1	17
2	21
3	22
4	18
5	15
6	11
7	8
8	5
9	4
10	7
11	10
12	14
13	17
14	21
15	22
16	18
17	15
18	11
19	8
20	5
21	4
22	7
23	10



2. From the data and graph identify the:

Maximum _____ **Minimum** _____

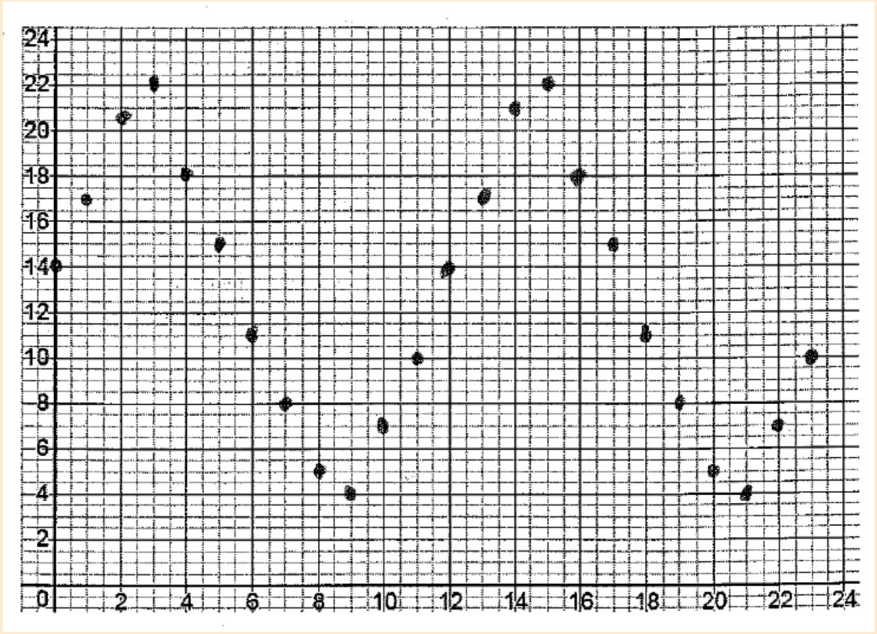
Principal Axis: Y = _____ **Amplitude** _____

Period _____

$y = \sin bx$, $b \neq 0$, b affects the period and the period is $\frac{360°}{|b|}$.

Equation

Solution: Fairbanks, AK



Solution: Fairbanks, AK

2. From the data and graph identify the:

Maximum 22 **Minimum** 4

$\frac{22+4}{2} = \frac{26}{2} = 13$ $13-4=9$, $22-13=9$

Principal Axis: Y = 13 **Amplitude** 9

Period 12 months so $\frac{360}{12} = B = 30$

3. Write a periodic equation that will model the data. ~~$y = \sin(x)$~~ $y = 9 \cdot \sin(30x) + 13$

The graph is a sine graph because the y-axis is near the principal axis of 13 hours.

4. Use the information from (#2) to find the total number of daylight hours in one year for your city. $y = 13$ is average so $\frac{13 \text{ hours}}{1 \text{ day}} \cdot 365 \text{ days} = 4745 \text{ hours}$

Solution: Fairbanks, AK

4. Use the information from (#2) to find the total number of daylight hours in one year for your city. $y=13$ is average so $\frac{13 \text{ hours}}{1 \text{ day}} \cdot 365 \text{ days} = 4745 \text{ hours}$

4745 hours in a year!

5. Verify your equation algebraically.

Month 6
Actual = 11 hrs

$y = 9\sin(30 \cdot 6) + 13$

$y = 9\sin(180) + 13$

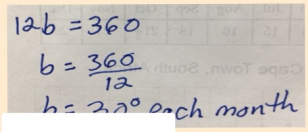
$y = 0 + 13 = 13 \text{ hours}$

Model is ***moderately*** accurate since 13 hours is 2 hours away from the actual time.

Solution: Fairbanks, AK **y = 9sin(30t) + 13**

6. Justify the parts of your equation model

- **a= 9** The data shows the max as 22 hours of day light and min as 4 hours. This shows the distance between the ***max*** and principal axis ***and*** the distance between the ***min*** and principal axis is about 9.
- **b=30** I noticed the curve crossed the y-axis at about 14 hours, and this number of hours began to repeat itself after 12 months. This shows the cycle of hours of daylight begin to repeat after 12 months, so the period is 12 months.
- **30** waves of 12 months in 360 degrees.
- Period = 360/**b**, so 12 = 360/**b**.



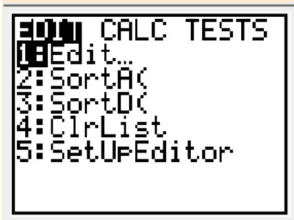
- **c=13** The mean between the min/max is 13, so the mean line (*principal axis*) is at y = 13.

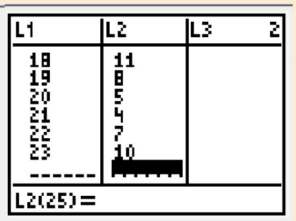
USING CALCULATOR TO CHECK EQUATION/GRAPH

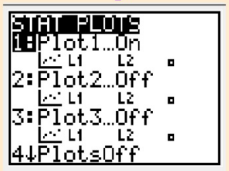
1) "Stat, edit" Enter data to see curve in scatter plot.

$y = 9\sin(30t) + 13$

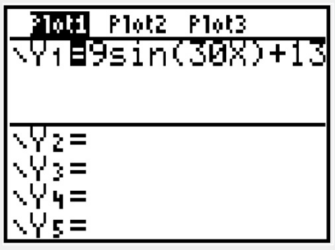
2) Turn on scatter plot "2nd y="

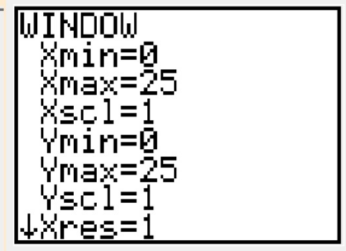


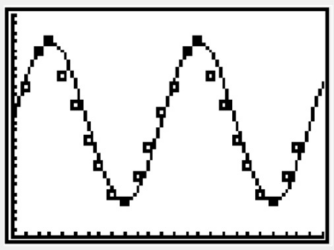




3) Enter equation in "y=" , adjust window, graph .







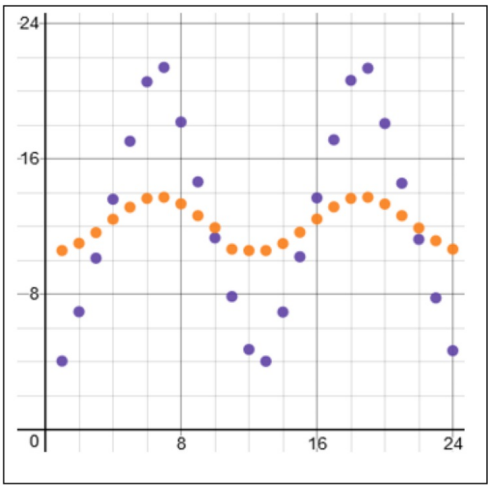
Additional Questions to consider

DONE? Additional questions to consider:

What are the similarities between both graphs?

What natural events account for these similarities?

What are the differences in the data? What could have created these differences?



Additional Questions to consider

6. What are the similarities between both graphs? What natural events account for these similarities?

Both have periods of 12 months and are sinusoidal.
Both appear to be in the Northern hemisphere.
Similar Principal Axis values.

7. What are the differences in the data? What could have created these differences?

AK has a larger amplitude so the Min + Max are farther apart. This is likely due to its location that is closer the Earth's poles.

6. What are the similarities between both graphs? What natural events account for these similarities?

Both graphs have periods of 12 months, and they are both sinusoidal. The sinusoidal nature is due to the changing seasons and the 12 month period due to the orbit of the Earth around the Sun

7. What are the differences in the data? What could have created these differences?

Maximum and minimum values in the Fairbanks data are further apart compared to the Miami data. This is due to Fairbanks being further north than Miami, resulting in greater seasonal variation in sunlight (more sun during summer, less during winter).

Exercises...

Complete Practice Quiz 4.2