

Name: _____

Where in the World is Carmen Sinusoidal?

This project will count as a QUIZ grade and will be due at the beginning of class Monday, Oct 30.

1. Choose 6 cities from different continents around the globe. Try to vary the cities' locations by choosing different hemispheres, latitudes, longitudes, altitudes, and proximities to things like large bodies of water, deserts, mountain ranges, etc. Mark the location of each on the map below



2. Find the average monthly temperature for each city and record below. Some good sites to search include www.climate-zone.com, or www.weatherbase.com. Make sure all temperatures are in Fahrenheit.

3. Go to www.desmos.com and create a scatterplot (add item, table) for each of your cities in a different color (click the settings wheel to change the color). Include values for a second year to see the sinusoidal pattern more clearly (13 corresponds to January year 2, 14 is February year 2, etc. through 24). You can change your window, axes and mode by clicking the wrench.

4. For your European, North and South American cities, create a *cosine* equation **without using regression**. Include this on your Desmos graph. You can hide your other scatterplots to see one at a time by clicking the color circle.

5. For your African, Asian, and Australian cities, create a *sine* equation using regression on your calculator. Include these on your Desmos graph. You can hide your other graphs and scatter plots by clicking on the color wheel.

6. You should have SIX scatterplots and SIX different equations on your desmos graph.

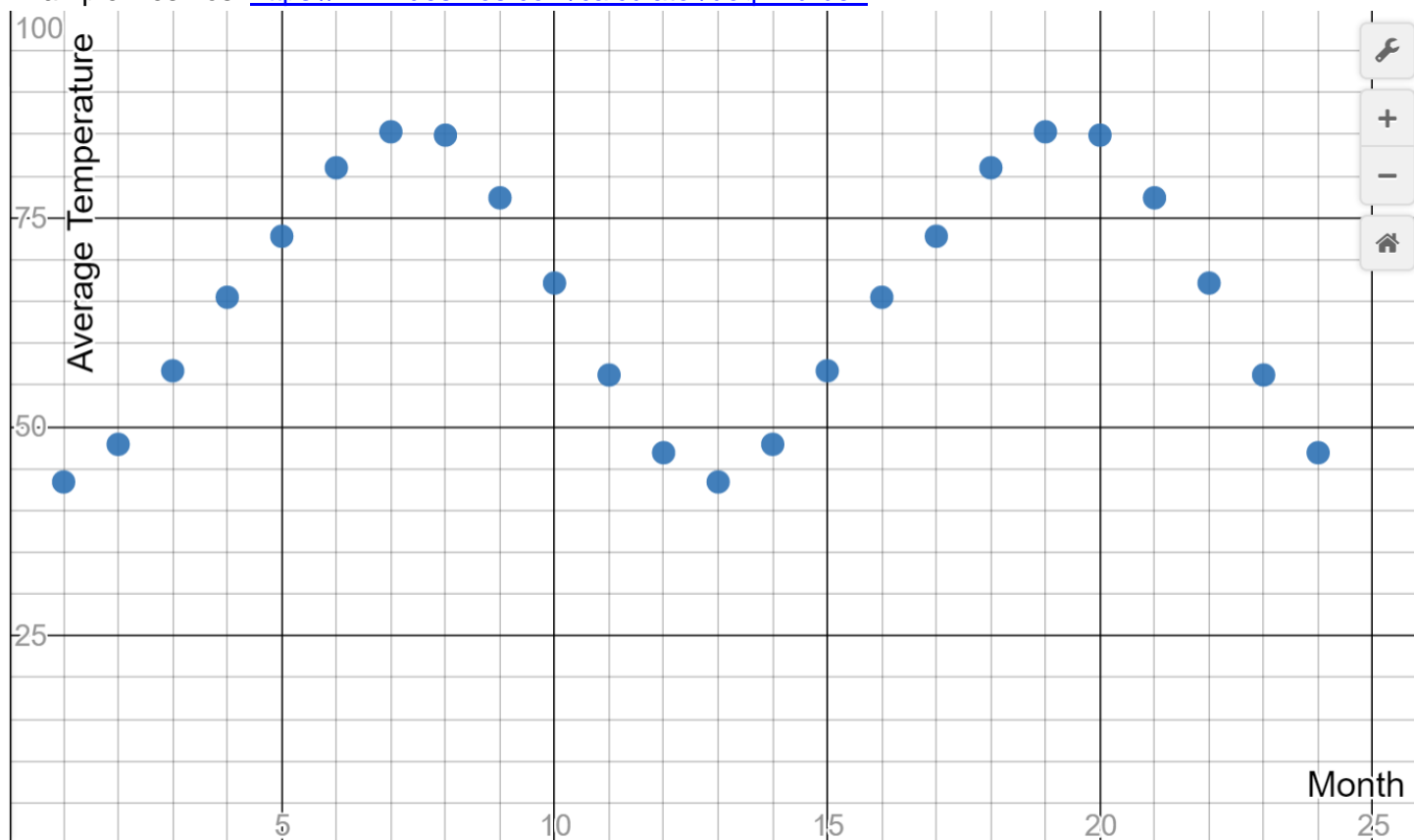
7. Submit your Desmos graph to svkorotkow@g.risd.org and answer the questions below.

EXAMPLE**North America**

City: Dallas

Color on Desmos: Blue

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp	43.4	47.9	56.7	65.5	72.8	81.0	85.3	84.9	77.4	67.2	56.2	46.9

Example Desmos: <https://www.desmos.com/calculator/uoqw4brben>

Cosine equation (don't use regression): _____

Sine equation (use regression on your calculator): _____

Regression Instructions:

Name: _____

North America

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Cosine equation (don't use regression): _____

South America

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Cosine equation (don't use regression): _____

Europe

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Cosine equation (don't use regression): _____

Asia

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Sine equation (use regression on your calculator): _____

Africa

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Sine equation (use regression on your calculator): _____

Australia/Oceania

City: _____

Color on Desmos: _____

Month	1 (Jan)	2 (Feb)	3 (Mar)	4 (April)	5 (May)	6 (June)	7 (July)	8 (Aug)	9 (Sept)	10 (Oct)	11 (Nov)	12 (Dec)
Avg Temp												

Sine equation (use regression on your calculator): _____

(turn over for questions!!!)

Please answer the following questions below in complete sentences.

1. What are some reasons for the differences in temperature graphs between each city?

2. What is the actual meaning for the c value in each equation?

3. Which value(s) (a, b, c, and/or d) would change if January was month 0? Why?

4. What are some other real world phenomenon that could be modeled using a periodic (sine or cosine) function? (It's okay if you need to research this question!)