

**Standards:**

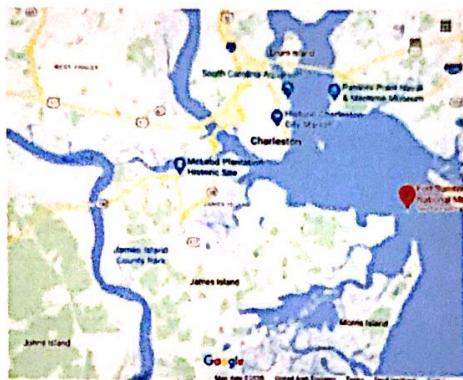
- **8.EE.5.** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in two different ways.
- **F-IF.B.6** Calculate and interpret the average rate of change of a function... Estimate the rate of change from a graph.
- **C: 8.EE.8a** Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- **A-REI.C.6** Solve systems of linear equations exactly... focusing on pairs of linear equations in two variables.

- **Driving Question:** How will mathematics help me if I want to go on a field trip to visit ancient battle sites?
- **Project Introduction:** Congratulations! You have been selected by an anonymous sponsor to go on a road trip adventure that will include visiting famous Civil War Battle Sites. Your sponsor has allocated a budget of \$25,000 for your adventure. You need to consider two types of expenses: Getting there (Vehicle rental and gas) and daily expenses (Food and lodging). You will plan your trip to include four famous battle sites to visit (list provide), and you will make a complete budget of your trip within the given limit by choosing different options.
- **Project Tasks:** In this project you will:
1. Read through all the sections of the project before you start, to get an idea of the options and expenses
  2. Plan your trip by completing each section of the project planning guide.
  3. Calculate expenses and write and interpret equations
  4. Sketch equations
  5. Use your sketches to answer questions about your trip

## Trip Requirements:

The sponsor for your adventure has included the following requirements:

- Your travel must begin and end in **Fort Sumter, South Carolina**
- You may not travel more than 10 hours in any one day.
- You may stop as many times as you like.
- Your trip must be no less than 7 days and no more than 30 days.
- You may take as many as 3 other people on your trip.



## List of Battle Sites:

Below is a list of some famous battle sites you can still visit today. Choose 4 sites to include on your road trip (each group member should be responsible for one site). Remember, the starting point MUST be Fort Sumter, South Carolina

- ① **Fort Sumter, South Carolina**
- ② **Gettysburg National Park, Pennsylvania**
- ③ **Appomattox Court House, Virginia**
4. **Glorieta Pass, New Mexico**
5. **Vicksburg National Military Park, Mississippi**
- ⑥ **Antietam National Battlefield, Maryland**
7. **Lookout Mountain Battlefield, Tennessee**
8. **Monocacy National Battlefield, Maryland**

## Part 1: Whose roadtrippin'?

List the names of friends, families, famous people, etc. you would like to take on the trip. Write your name on the first line. Remember 3 people plus you are the maximum!

- 1- .... *Messina* .....
- 2- .... *Linicita* .....
- 3- .... *Pigment* .....
- 4- .... *Me* .....

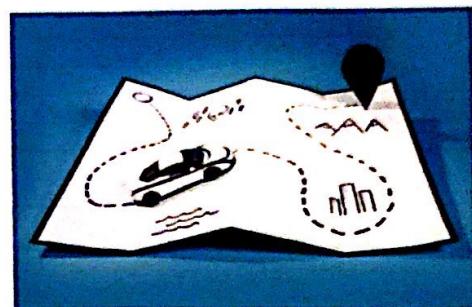


## Part 2: Plan your route.

What kind of adventure will you take? Are you going to explore the mountains and deserts, visit landmarks, check out all the big cities you can get to, or some combination? You decide.

Create a map for your trip.

Go to [maps.google.com](http://maps.google.com)



Enter your starting point as **Fort Sumter, South Carolina**

Click on directions.

Type Fort Sumter, South Carolina as the starting point or click on the double arrow symbol.

Type the name of your first destination.

Click add destination to add additional places to visit.

Complete the table on the next page. (NOTE: If you need additional lines, ask your teacher for an additional full-page table.)

Print your map or take a screen shot to include in your final project.

Day	Starting Location	Destination	Hours of Travel	Miles travelled
1	Charleston, SC *	Pisgah National Forest, NC	4 hours 15min	268 mi
2	Pisgah National Forest, NC	Pisgah National Forest, NC	0	0
3	Pisgah National Forest, NC	Appomattox, VA *	4hr 10 min	246mi
4	Appomattox, VA	Virginia Beach	3 hr 15min	201.5 mi
5	Virginia Beach	Virginia Beach	0	0
6	Virginia Beach	Washington, D.C.	3 hr 16min	209 mi
7	Washington DC	Washington DC	0	0
8	Washington DC	Washington DC	0	0

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9	Washington DC	Sharpsburg , MD *	1 hr 22 min	69 mi
10	Sharpsburg, MD	Gettysburg > PA	1 hr 1 min	43.4 mi
11	Gettysburg, PA	New York	3 hr 32 mi	211 mi
12	New York	New York	0	0

Note: If you are staying in a location for more than one day, simply indicate the same starting location and destination and 0 for the hours travelled and miles travelled. See the example below.

**EXAMPLE:**

Day	Starting Location	Destination	Hours of Travel	Miles travelled
1	San Francisco, CA	Napa, CA	1 hr. 15 min.	48.8 miles
	Napa, CA	Napa, CA	0	0
3	Napa, CA	Napa, CA	0	0
4	Napa, CA	Lake Tahoe, NV	3 hr. 6 min.	177 miles

13	New York	New York	0	0
14	New York	New York	0	0

### Part 3: Daily Expenses:

On your trip you can live large or live simply. Remember you need to spend at least \$15,000 but no more than \$25,000. The expenses include not only daily expenses but also vehicle expenses. Use the information below to plan your daily expenses and make changes as needed for your budget. Choose only one type of food expense, lodging, and bags for your trip.

FOOD	HAUT CUISINE \$250 per day per person Fine dining	LUGGAGE	LUXURY \$400 per person
LODGING	5-STARS \$500 per day Up to 4 people in each suite	ATHLETIC BAG \$125 per person	
	HEALTHY CASUAL \$125 per day per person Healthy, often organic food in simple restaurants	JUST A BED \$200 per day Up to 2 people in each room	
	QUICK AND EASY \$50 per day per person Fast food every day	TENT IT \$50 per day Up to 4 people in each campground	

- a) What will your daily food budget selection be and why?

Healthy Casual because I want to be healthy and not loose money on expensive food

- b) What will your lodging budget be per day and why?

5-Stars because I want to live in a comfortable place

- c) Given the number of people travelling with you, how much will your (daily) food and lodging expenses be?

$$y = 4x \cdot 125x + 500x = 1000x$$

- d) What type of luggage will you take and why?

Athletic bag because I am scared that the luxury bag will break and I will lose the money

- e) Write a linear equation for your daily expenses in the form  $y=mx+b$ .

$$y = 1000x + 125 \times 4 = 1000x + 500$$

- f) What does the  $m$  in your equation represent?

$m$  is the expenses that increase when the number of days increase

#### Part 4: Getting There Expenses

Select the vehicle that you will take on your road trip. Do not worry the donor has included a driver for the adventure. Be sure to pay attention to the gas mileage. You will need that in calculating your expenses. If you select a vehicle that cannot carry your entire group, you will need to rent more than one and pay for gas for more than one. For example, if you select a motorcycle and there are 4 people on your trip, you will need 2 motorcycles.

VEHICLES and Boats					
<b>Motorcycle with side Car</b> \$35/day 2 passengers 82 MPG  (MPG= Miles Per Gallon)	<b>Hybrid</b> \$50/day 4 passengers 48 MPG	<b>Luxury Sedan</b> \$85/day 4 passengers 32 MPG	<b>Hybrid SUV</b> \$115/day 6 passengers 31 MPG	<b>Luxury Electric Sedan</b> \$150/day 6 passengers No MPG Charging fee \$12/100 miles	<b>Boat</b> \$150/day 6 passengers 15 MPG

- a) Which vehicle will you select for your road trip and why?

*Luxury sedan because it have increased level of comfort and quality*

- b) How many gallons of gasoline will it take to complete your trip (skip if you chose all electric sedan)?

$$1,247.5 \div 32 = 38.98 \text{ gallon}$$

- c) How much will your fuel (gas or electricity cost for the trip? (Gas for the trip is \$3/gallon).

$$38.98 \times 3 = \$116.94$$

- d) Write an equation for the rental and the cost of the gas per day in the form  $y=mx+b$ . ( $x = \# \text{ of days}$ ;  $y = \text{vehicle expenses}$ ).

$$y = 85x + 116.94$$

- e) What do m and b represent? Describe them in the context of the problem

*m = 85, is the rental per day for the vehicle*

*and b = 116.94, is the cost of the gas for the whole trip.*

**Part 5: Total Expenses:**

Now that you have calculated costs for individual parts of your adventure, you need to total it and see if you are within the range of \$7,000 to \$12,500. Complete the table below.

Week	Getting There Expenses	Daily Expenses	Total Expenses
Week 1	$85 \times 7 + 86.67$ $= \$681.67$	$1000(7) + 500$ $= 7500$	$8181.67$
Week 2	$85 \times 7 + 30.31$ $= 625.31$	$1000 \times 7$ $= 7500$	$8,125.31$
Week 3			
Week 4			
Last 2 days			

Make adjustments to your choices if you have not met the requirements until you have a budget between \$15,000 and \$25,000.

On the next two pages graph your three expense lines: the getting there expenses, daily expenses and total expenses.

Getting there expenses:

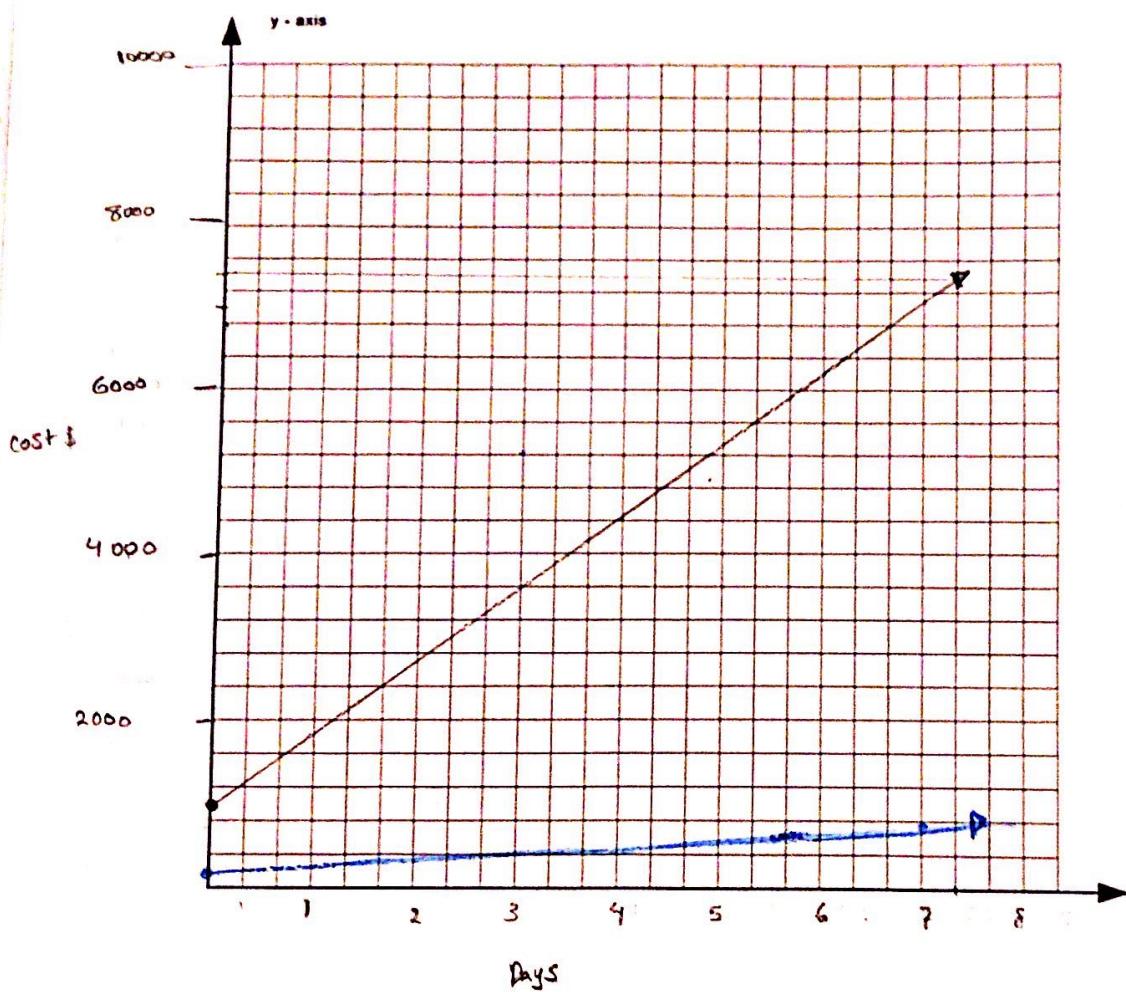
$$y = 85x + 116.74$$

Daily Expenses:

$$y = 1000x + 500$$

**Part 6: Graphing:**

- a) Graph your getting there expenses and daily expenses on the graph. Label your graph and lines clearly



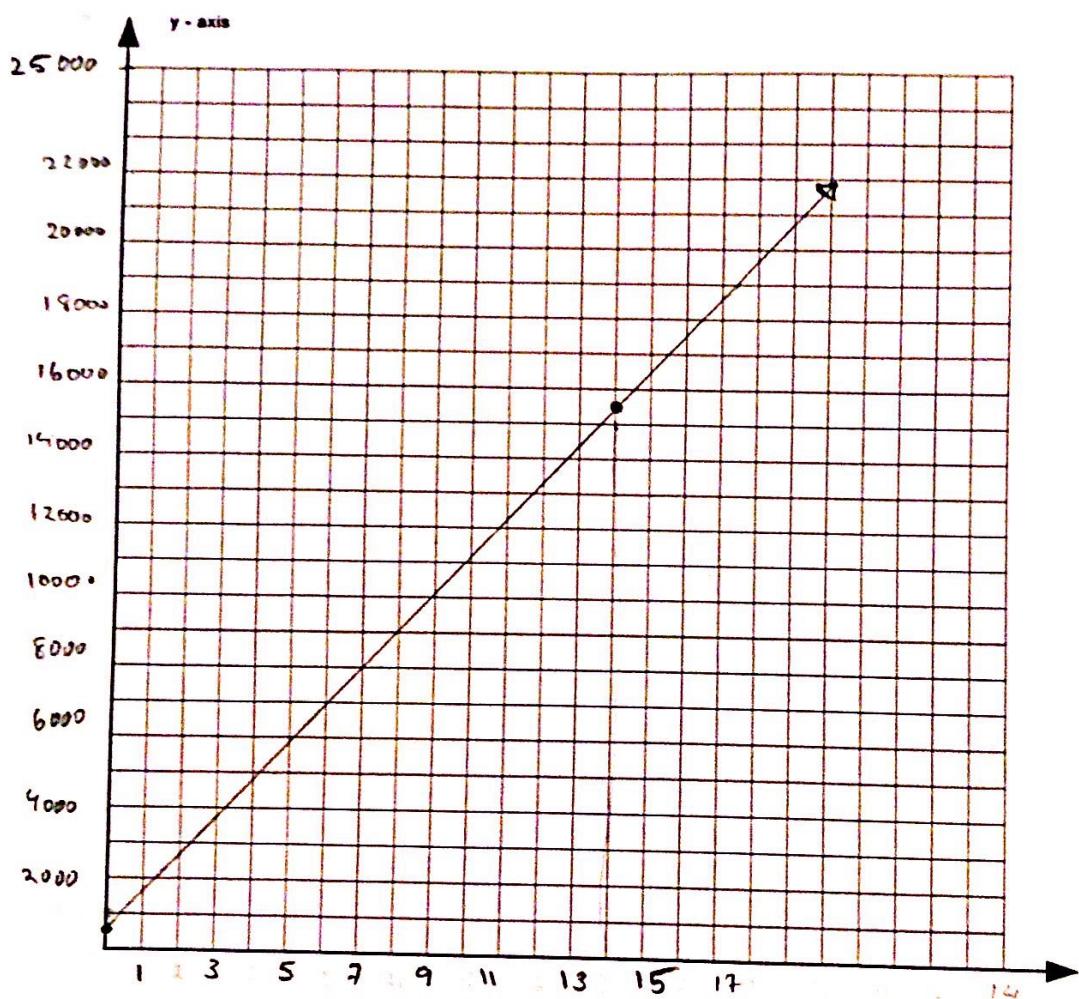
- b) On which day of your trip were the expenses for getting there the same as daily expenses? How do you know? (If they were never the same explain how did you know)

They will never intersect, as can be seen from the graph, the line will never intersect, since the y-intercept and the slope of the "getting there expenses" are less than the "daily expenses".

$$y = 1000x + 500 + 85x + 116.7$$

$$= 1085x + 616.7$$

- c) Graph your Total Expenses on the graph. Label your graph and lines clearly

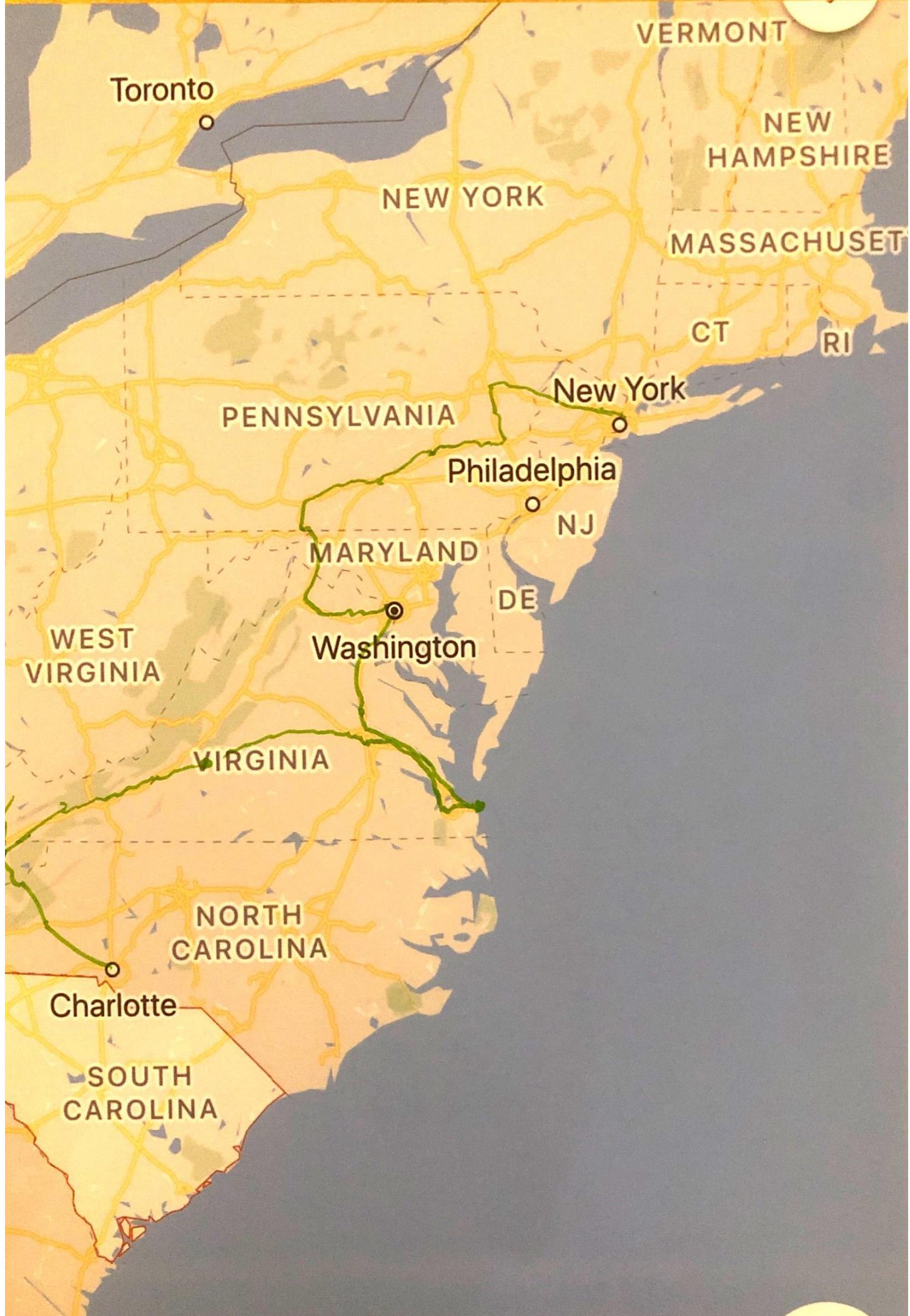


- d) On which day were the total expenses of your trip \$20,000? How did you know?

On 17 Days Because the \$20,000 touched the line in the number of 17 Days

- e) In your opinion, where was Maths the most relevant and useful on your trip plan?

when calculating the daily expense and the total expenses



### Rubric

	Criteria				Points
	4	3	2	1	
Maths Content	Demonstrates a clear knowledge and application of maths skills	Demonstrates a general knowledge and application of maths skills	Demonstrates a limited knowledge and application of maths skills	Demonstrates little or no knowledge or application of maths skills	
Explanation and work shown	Student can explain how to solve, his work is shown clearly	Student can explain how to solve but his work isn't all shown	Student can explain only a small part of the work, many steps are missing	Student cannot explain any of the work. Work is not shown	
Use of Visuals	Graphs are accurate and all are labeled correctly	Graphs are accurate but they are not labeled correctly	Graphs have some mistakes, they are not labeled correctly	None of the graphs are sketched correctly, and they are not labeled	
Use of mathematical terminology	Mathematical terminology is prevalent and used correctly	Mathematical terminology correctly used	Some mathematical terminology is presented, but not correctly used	No mathematical terminology is used or attempted	
Accuracy	Student's answer is completely correct	Student's answer is mostly correct	Student's answer is mostly incorrect	Student's answer is completely incorrect	
Quality of work presented	Excellent presentation in a neat and organized manner	Very good organized presentation	Somehow neat presentation	The work presented is not neat and lacks organization	
Collaboration and Contribution	Routinely provides useful ideas when participating in the group discussion. A definite leader who puts in a lot of effort.	Usually provides useful ideas when participating in the group discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group discussion. May refuse to participate.	