

Name: _____

							Total
Criteria 1 (Method and Steps Taken):	0	8	16	24	32	40	
Criteria 2 (Calculations):	0	8	16	24	32	40	
Criteria 3 & 4 (Validation, Clarity and Completeness):	0	4	8	12	16	20	

Mathematics - Sec 5 - Cultural, Social and Technical
Situational Problem – Class Trip (50 min)

Some of the Grade 11 CST Math students are taking a trip to New York City. The students have decided to go on a trip organized by L. Euler Travel. While L. Euler Travel has planned a lot of the trip already, the students must: 1) determine the length of their trip; 2) calculate the food and hotel costs; 3) decide on the number of vans to rent; 4) calculate the total van costs; and 5) plan a fundraiser.

TRIP LENGTH

Because the students want to take the trip this year, they are on a tight timeline. Below are a series of steps the students must complete, as well as the length of each step and any necessary prior steps.

Step	Description	Time (days)	Prior Step(s)
A	Negotiate contract with L. Euler Travel company	50	None
B	Select itinerary	40	A
C	Advertise to students and student sign-up	60	None
D	Determine museums to visit	10	C
E	Plan fundraiser and order supplies	25	C
F	Gather quotes and select company for van rental	5	B and D
G	Gather permission forms and emergency contact information	15	E
H	Run fundraiser	45	E
I	Finalize detail with L. Euler Travel company	40	F and G
J	Go on trip	???	H and I
K	Return home	None	J

The students want the trip to be as long as possible, but the entire planning process and trip can take no longer than 150 days. Use the graph to determine the longest possible length of the trip (Step J).

FOOD AND HOTEL COSTS

L. Euler Travel put together a trip package that includes food and hotels. The company charges \$3000/day for the whole group to go on the trip.

VAN RENTALS

The students are trying to keep the cost as low as possible, so they have opted to drive to New York City rather than fly. Some students do not get along and refuse to ride in a van together. The list of students and their incompatibilities are given in the table below.

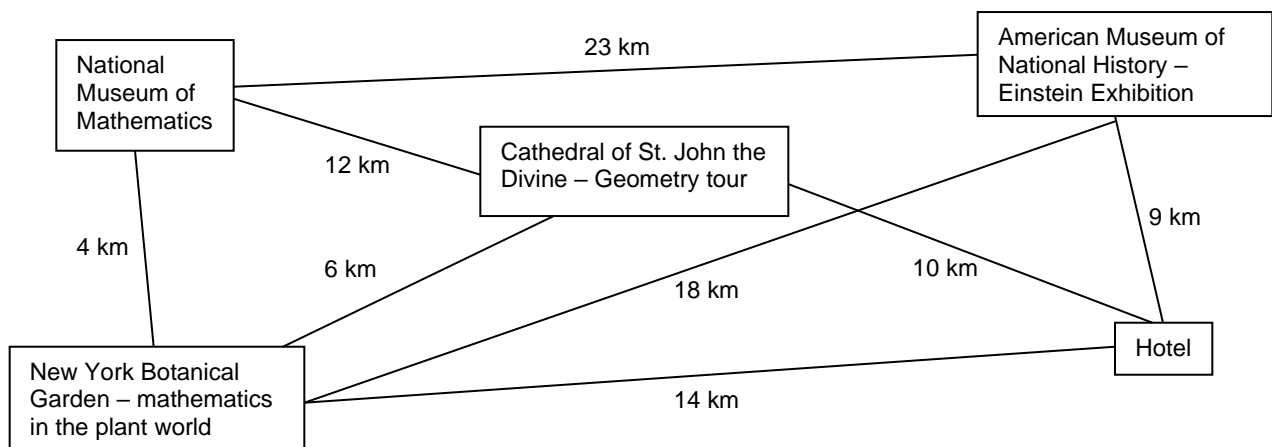
The students want to rent the fewest number of vans while keeping students who do not get along in separate vans.

Student	Incompatible with...
A	B, C, D, E
B	A, C, F
C	A, B, D, E, G
D	A, C, F
E	A, C, G
F	B, D
G	C, E

Note: There are many students going on the trip, but only those with conflicts are shown. The other students can ride in any van and therefore do not need to be considered in determining the total number of vans.

VAN COSTS

While in New York City, students will use the metro on most days, except for one day of intense sight-seeing. The graph below shows the different sites (vertices) the students will visit, along with the distances between sights (given in km). The van will make the shortest circuit possible, while still getting the students to each of the sites. You must start and end at the hotel.



The vans will drive from Gatineau to New York City (720 km), around the city for the day of sightseeing, and back to Gatineau (720 km).

The vans cost \$150 per day per van, plus an additional \$0.20 for every km driven (per van).

FUNDRAISER

In order to pay for a portion of total costs for the food, hotels, and van rentals, the students are holding a fundraiser. The students will sell sheets of math stickers and fancy geometry sets. The number of each item the students sell must adhere to the constraints below:

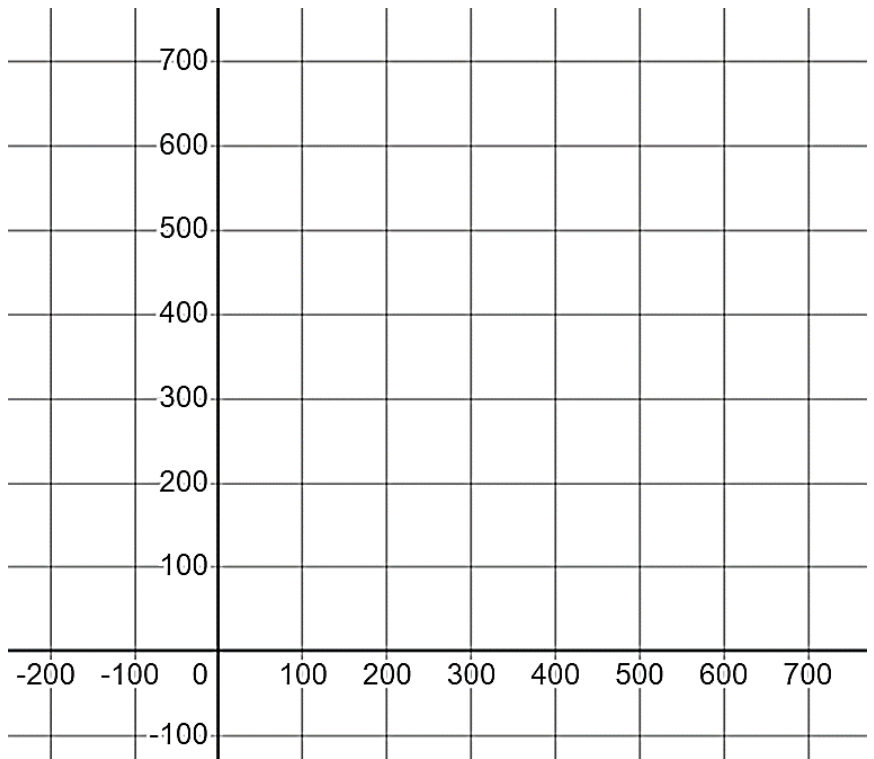
- The students sell a maximum of 500 sheets of math stickers
- The students sell at least half as many sheets of math stickers as fancy geometry sets
- The students sell no more than 600 fancy geometry sets
- The students sell a minimum of 600 items total.

The students earn a profit of \$5 for every sheet of math stickers they sell. The students make the maximum possible profit on this fundraiser.

Given the students earn between 30% and 40% of the total trip costs, determine a **possible amount of profit the students make for each fancy geometry set they sell.**

Your Solution:

Your Solution:



The students could earn a profit of \$_____ for each fancy geometry set sold.