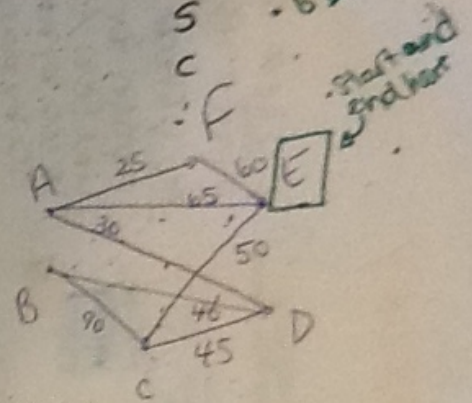


# GRAPH THEORY QUESTIONS FROM TUTORIAL TODAY:

## TOPIC 2: GRAPH THEORY

Patricia is planning a trip during which she will visit cities A, B, C, D, E and F. She will drive from one city to the other. The following table shows the distance she must travel to get from one city to another.

TRAVEL BETWEEN CITIES	DISTANCE (km)
A and D	30 ✓
A and E	65 ✓
A and F	25 ✓
B and C	90 ✓
B and D	40 ✓
C and D	45 ✓
C and E	50 ✓
E and F	60 ✓



Step 1: Draw your graph

#22

Step 2: Take the rules they gave you into consideration.

Step 3: Find shortest path

When preparing her itinerary, Patricia takes certain constraints into account. She wants to:

- visit cities A, B, C, D, E and F
- minimize the total distance travelled
- start her trip in city E
- visit city B before city A
- finish her trip in city E

OPTIONS:

E C B D A F E  
 $50 + 90 + 40 + 30 + 25 + 60 = 295$

X E F A ← Can't go to A before B

X E A

E C D B D A F E  
 $40 + 45 + 40 + 40 + 30 + 25 + 60 = 280$

Step 4: Answer Question

What should be Patricia's itinerary?  
 Show all your work. E C D B D A F E.

## TOPIC 2: GRAPH THEORY

#23

Melanie visits a group of islands A, B, C, D and E. She can travel by boat or airplane. The following tables show the cost of travelling between different islands according to the mode of transportation used.

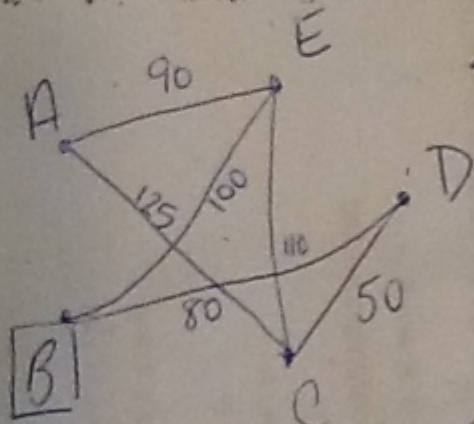
Travelling by boat between islands	Cost (\$)
A and E	100
B and D	80
B and E	140
C and D	50
C and E	110

Travelling by airplane between islands	Cost (\$)
A and C	125
A and E	90
B and E	100

Melanie wants to begin and end her trip on island B and visit all 6 islands.

What are Melanie's total minimum travelling expenses?

Show all your work.



Options

BEACDB  
 $100 + 90 + 125 + 50 + 80 = 445$

BDCAEB  
 → same but backwards

× BDCEAEB  
 $80 + 50 + 110 + 90 + 90 + 100 = 520$

either boat or plane is allowed

Step 1: Choose best option for each line (ex: A and E is 100 by boat and 90 by plane so we take the plane).

Step 2: Draw graph.

Step 3: Look for best path that meets all the requirements

Step 4: Answer the question.

Melanie's minimum travelling expenses would be \$445.