

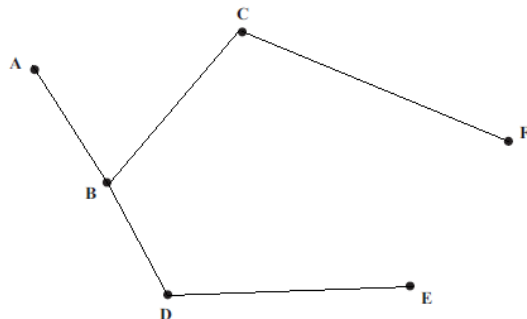
- 1a. Not in Alphabetical Order (1)
 1b. Quick or Bubble, doesn't matter. (4)
 1c. $(1+10)/2 = 6$
 6th name is ...
 Kim is before ...
 Delete ... and after
 Repeat until found.
 "Name found, search complete" (4)

- 2a.i) A tree is a graph with no cycles (1)
 ii) A spanning tree with the smallest possible total weight. (2)

- b) AB – 10 Y
 DE – 12 Y
 BC – 13 Y
 BD – 14 Y
 AC – 14 N
 BE – 15 N
 CE – 17 N
 CF – 18 Y
 FE – 18 N
 DF – 19 N
 BF – 20 N

AB DE BC BD CF (3)

- c) (1)



- d) No it isn't, could have added EF instead of CF (OR vice versa if you did the opposite to begin with) as both are of equal weight, and both do not create a loop if added.

3)

- a. $6x + 5y \leq 60$
 $3x > 2y$
 $x < 2y$
 $2x + 3y \geq 12$

b. Profit line:

Last region is last point for line to touch.

Region is intersect of $x=2y$ and $6x+5y=60$

$$17y = 60$$

$$Y = 60/17$$

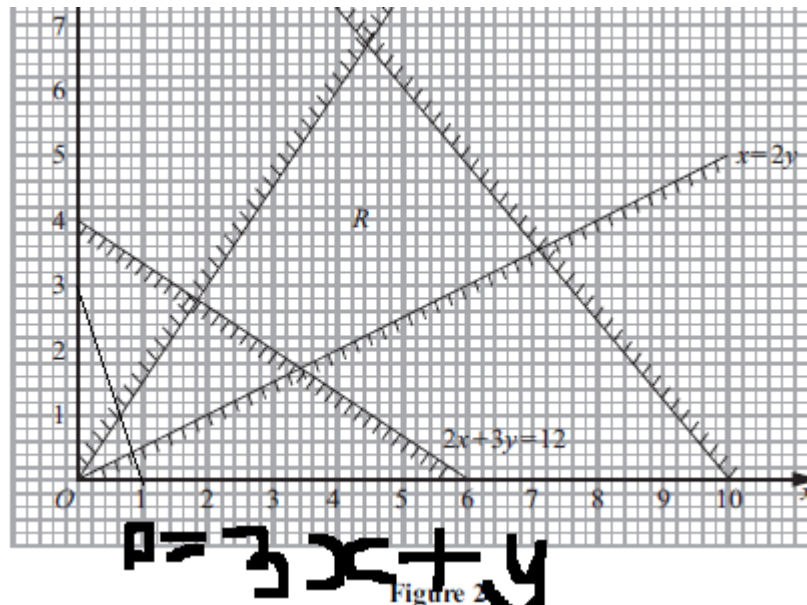
$$X = 120/17$$

$$c. P = 3x + y$$

$$P = 3(120/17) +$$

$$(60/17)$$

$$P = 24.7$$



d. (6,4)

4.

$$a. \quad A - 1 = H - 2$$

$$A - 1 = H - 3 = R - 4 = C - 5$$

$$b. \quad A - 3$$

$$R - 4$$

$$C - 5$$

$$c. \quad A - 1$$

$$H - 2$$

$$R - 3$$

$$J - 4$$

$$C - 5$$

5. Odd nodes are F, D, A, C

$$FD + AC = FgD + AC = 13 + 9 = 22 \quad \text{YES}$$

$$FA + DC = FecA + DC = 17 + 7 = 24$$

$$FC + DA = FeC + DcA = 8 + 16 = 24$$

Pipes twice are F-G, G-D, A-C

b. Anything that starts at A, finishes at A, includes the routes FGD DGF AC and CA

$$\text{Route: } 98 + 22 = 120 \text{ km}$$

c. Shortest route that doesn't have a D in it, is FC at 8, repeat FC once, finish at A

$$\text{Length of route is } 98 + 8 = 106 \text{ km}$$

6. You'll excuse me for not drawing it.

a. 71km ACDFEHG

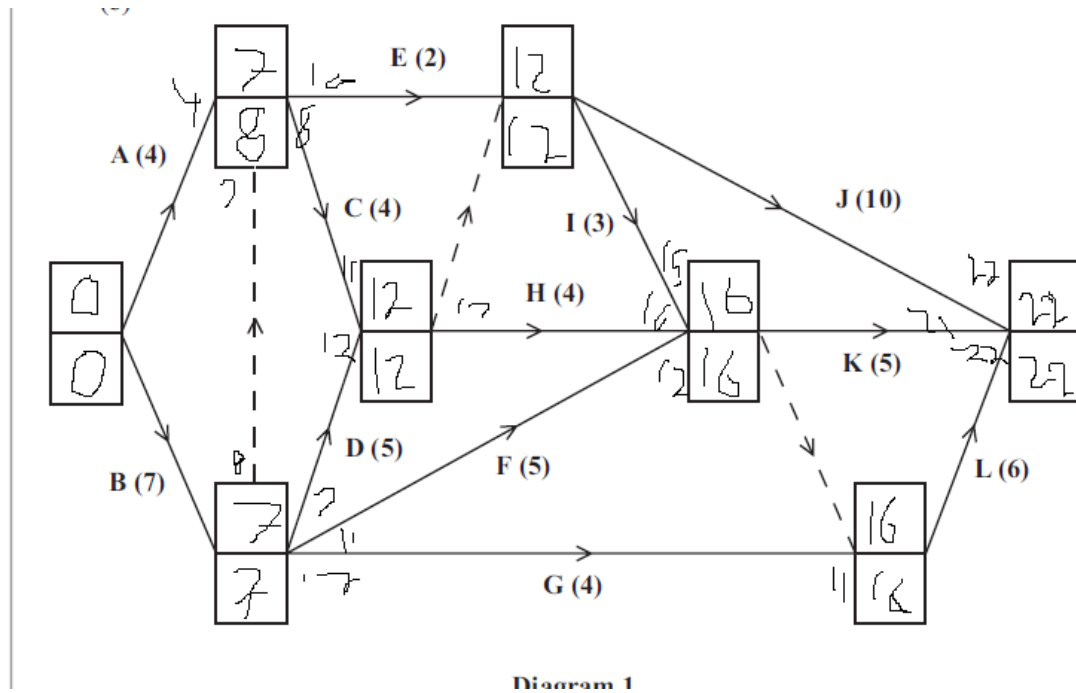
b. Worked backwards. Took the final value, took away the arc length, if it equalled the final value of the previous one, take that route.

c. 72 ACBEGH

7. a)

Activity	Preceded by	Activity	Preceded by	Activity	Preceded by
A	-	E	A B	I	E C D
B	-	F	B	J	E C D
C	A B	G	B	K	I H F
D	B	H	C D	L	I H F G

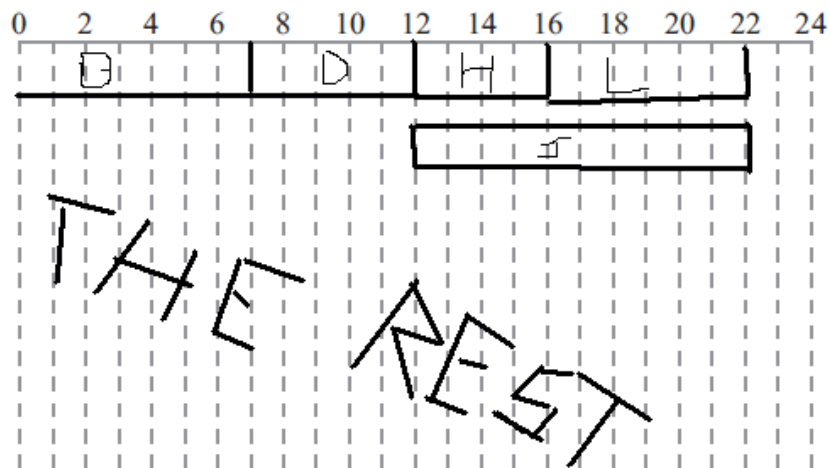
b)



c) BDHL

J

d)



It would appear that only the first bit was causing trouble, so to save time...

The rule is, when given a choice, always put the one that finishes first, in first.

Using the gantt chart, we can see that on day 7, halfway through it, four activities are happening, assuming all are started on time, which they should be, if they are all to finish in minimum time.

I'm not sure if there is another way to do this. Let me know if there is.

8)

Let Type A = X

Let Type B = Y

$$X \geq 50$$

$$Y \geq 0$$

$$0.2(X + Y) < X < 0.4(X + Y)$$

$$0.2X + 0.2Y < X$$

$$X + Y < 5X$$

$$Y < 4X$$

$$X < 0.4(X + Y)$$

$$X < 0.4X + 0.4Y$$

$$4X < X + Y$$

$$3X < Y$$

$$3X + 2Y \leq 200$$

$$P = 15X + 12Y$$