

1

DI May 2009 - Solutions

1 a)

	(1) A	(4) B	(5) C	(2) D	(3) E	(6) F
A	-	135	180	70	95	225
B	135	-	215	(125)	205	240
C	180	215	-	(150)	165	155
D	(70)	125	150	-	100	195
E	(95)	205	165	100	-	215
F	225	240	(155)	195	215	-

Order AD AE ~~AB~~ DC CF

b)

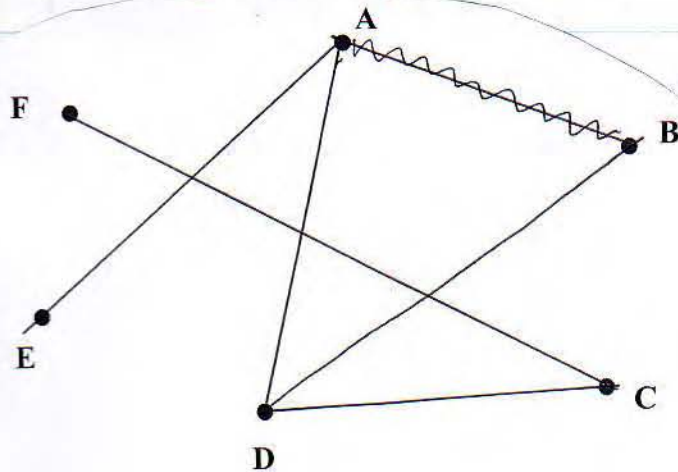


Diagram 1

c)

Total weight of tree $125 + 70 + 95 + 150 + 155 = 595$ km

2. a) total of lengths = 230

$\frac{230}{60} = 3 \frac{5}{6}$ \therefore lower bound = 4 rolls

<u>Roll 1</u>	<u>Roll 2</u>	<u>Roll 3</u>	<u>Roll 4</u>	<u>Roll 5</u>
32	45	23	38	10
17	12	28	16	
9				

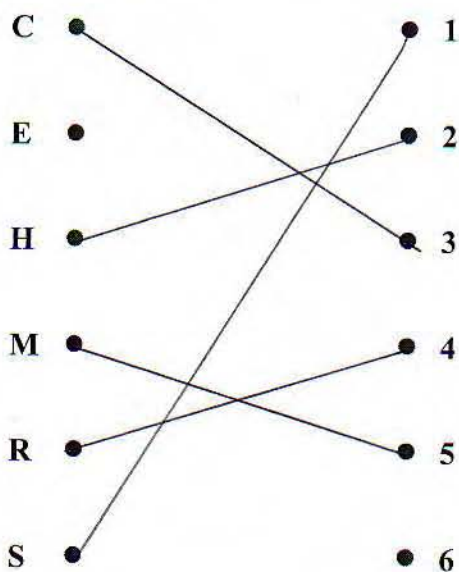
2c)	<u>Roll 1</u>	<u>Roll 2</u>	<u>Roll 3</u>	<u>Roll 4</u>
	32	38	45	17
	28	12	9	23
		10		16

3. a) $H-2=M-5=R-4$
^{CS}
 $H=2-M=5-R=4$

improved match $C=3 H=2 M=5 R=4 S=1$

b) C is the only worker who will do 3 and 6.

c) initial match



$$E-5=M-2=H-1=S$$

$$-3=C-6$$

C.S

$$E=5-M=2-H=1-S=3-C=6$$

complete match:

$$C=6 E=5 H=1 M=2 R=4 S=3$$

4. a) M, J, E, K, H, B, L, P, N, D

$\boxed{B} M, J, E, K, H, L, P, N, D$

$\boxed{B} E, D \boxed{H} M, J, K, L, P, N$

$\boxed{B} \boxed{D} E \boxed{H} J, K \boxed{L} M, P, N$

$\boxed{B, D, E, H} \boxed{J, K, L} M, N, \boxed{P}$

$\boxed{B, D, E, H, J, K, L} M, \boxed{N, P}$

sub lists of size 1
so stop.

3) b)

1. Beth
2. Dylan
3. Edward
4. Hegg
5. Jessie
6. Katie
7. Louis
8. Miri
9. Natsuko
10. Philip

$$\frac{1+10}{2} = 5.5 \quad 6 = \text{katie}$$

discard 1-6

$$\frac{7+10}{2} = 8.5 \quad 9 = \text{Natsuko}$$

discard 9-10

$$\frac{7+8}{2} = 7.5 \quad 8 = \text{Miri}$$

discard 8

7 = Louis \therefore FOUND

5. a) Odd vertices are C, D, E, G

CD = 45	CE = 39	CG = 65
EQ = <u>38</u>	DG = <u>43</u>	DE = <u>35</u>
83	82	100

repeat CE and DG

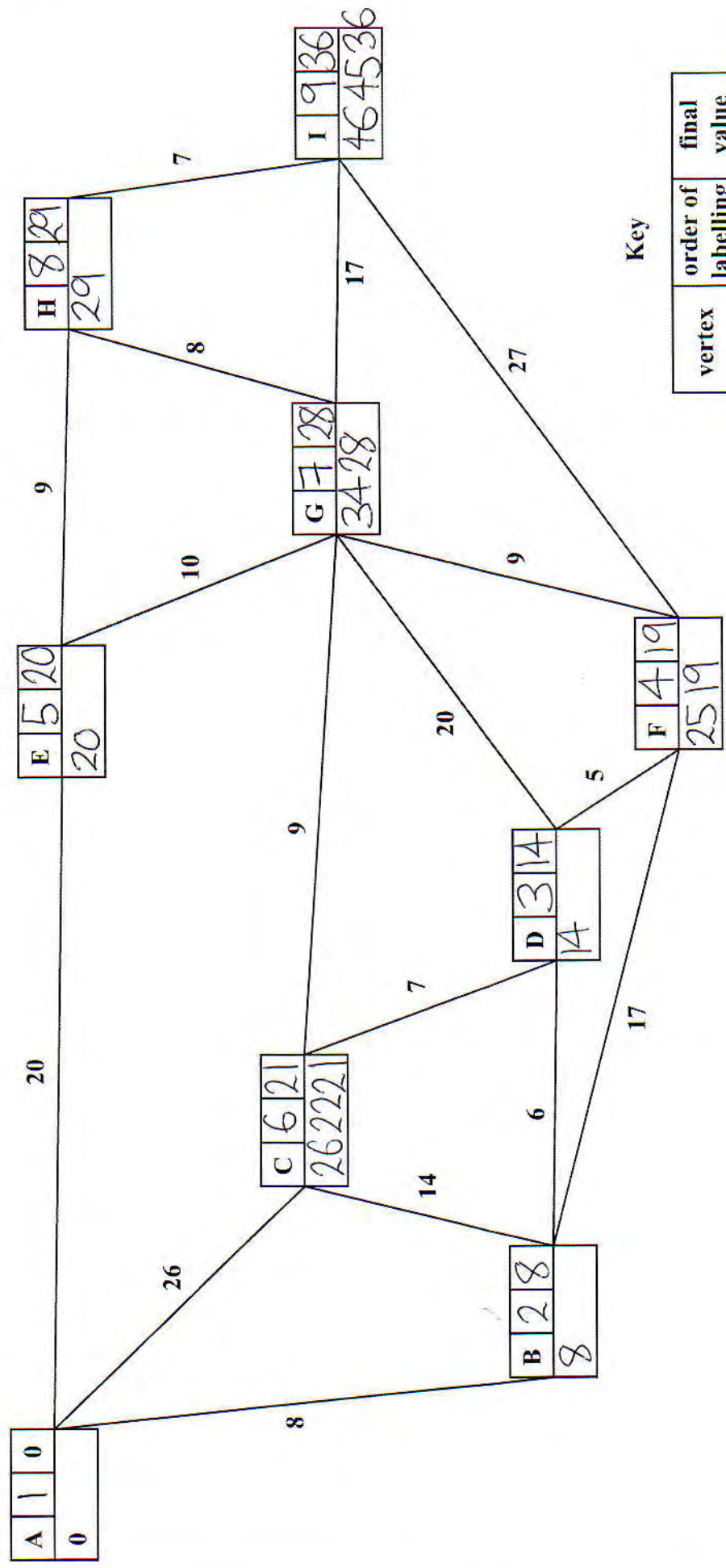
$$\text{length} = 625 + 82 = \underline{\underline{707 \text{ m}}}$$

b) start at G and finish at C as then only DE need ~~to~~ be repeated and the length will be

$$625 + 35 = \underline{\underline{660 \text{ m}}}$$

A

6. (a)



Key

vertex	order of labelling	final value
working values		

Shortest route

A E H I

(b) Shortest distance A to G

28

(Total 7 marks)

Q6

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5

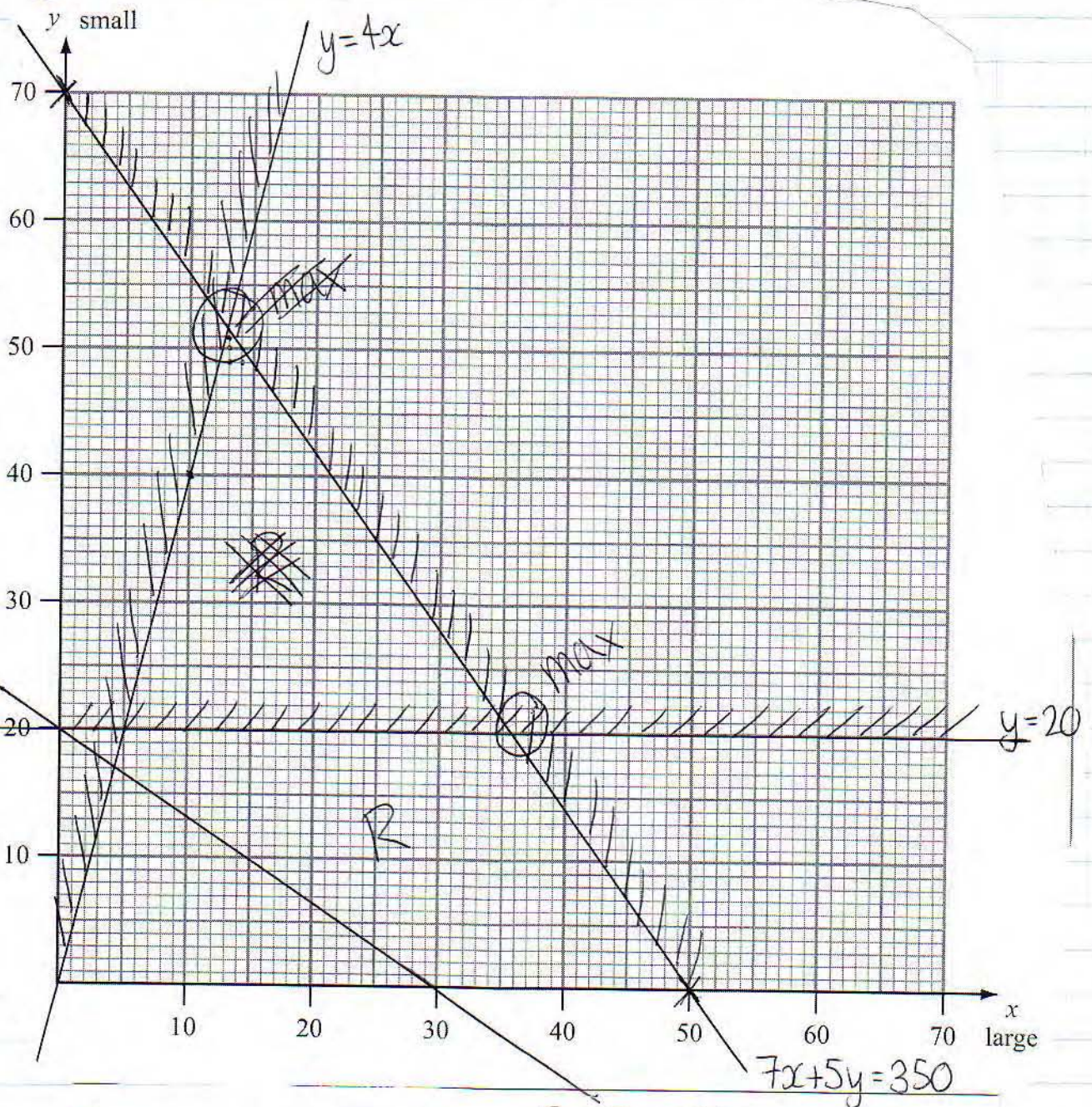
a) $7x + 5y \leq 350$

b) She can make at most 20 small baskets

~~She must make at least~~

The number of small baskets cannot exceed 4 times the number of large.

c)



d) $P = 2x + 3y$

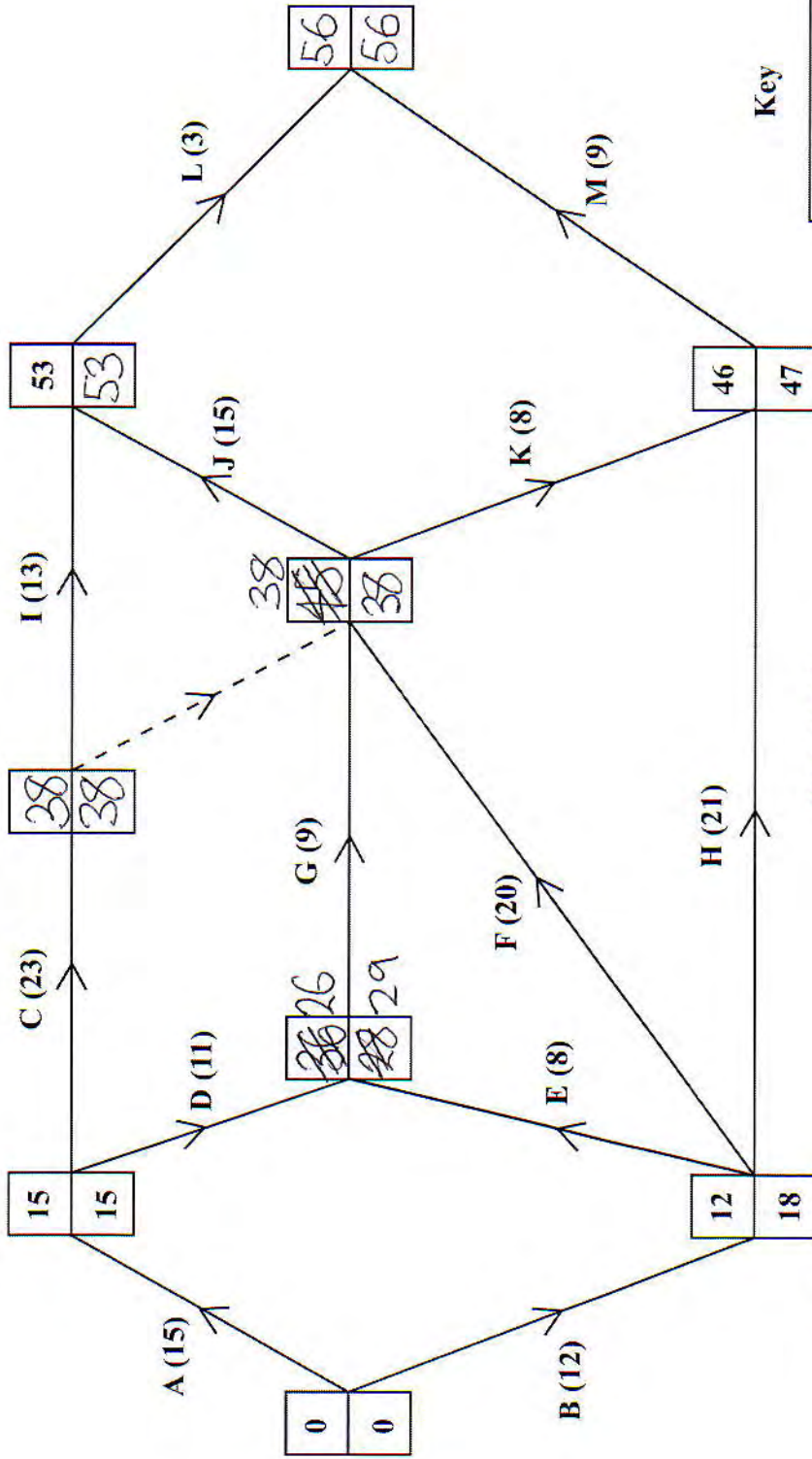
$2x + 3y = 60$
(objective line)

⑥ e) max point needs integer coordinates:

$$\text{max occurs at } (35, 20) \quad P = 2 \times 35 + 3 \times 20 = \underline{\underline{\pounds 130}}$$

7

8. (a)



(b) Critical activities ACSL

(c)

$M: 56 - 9 - 46 = 1$

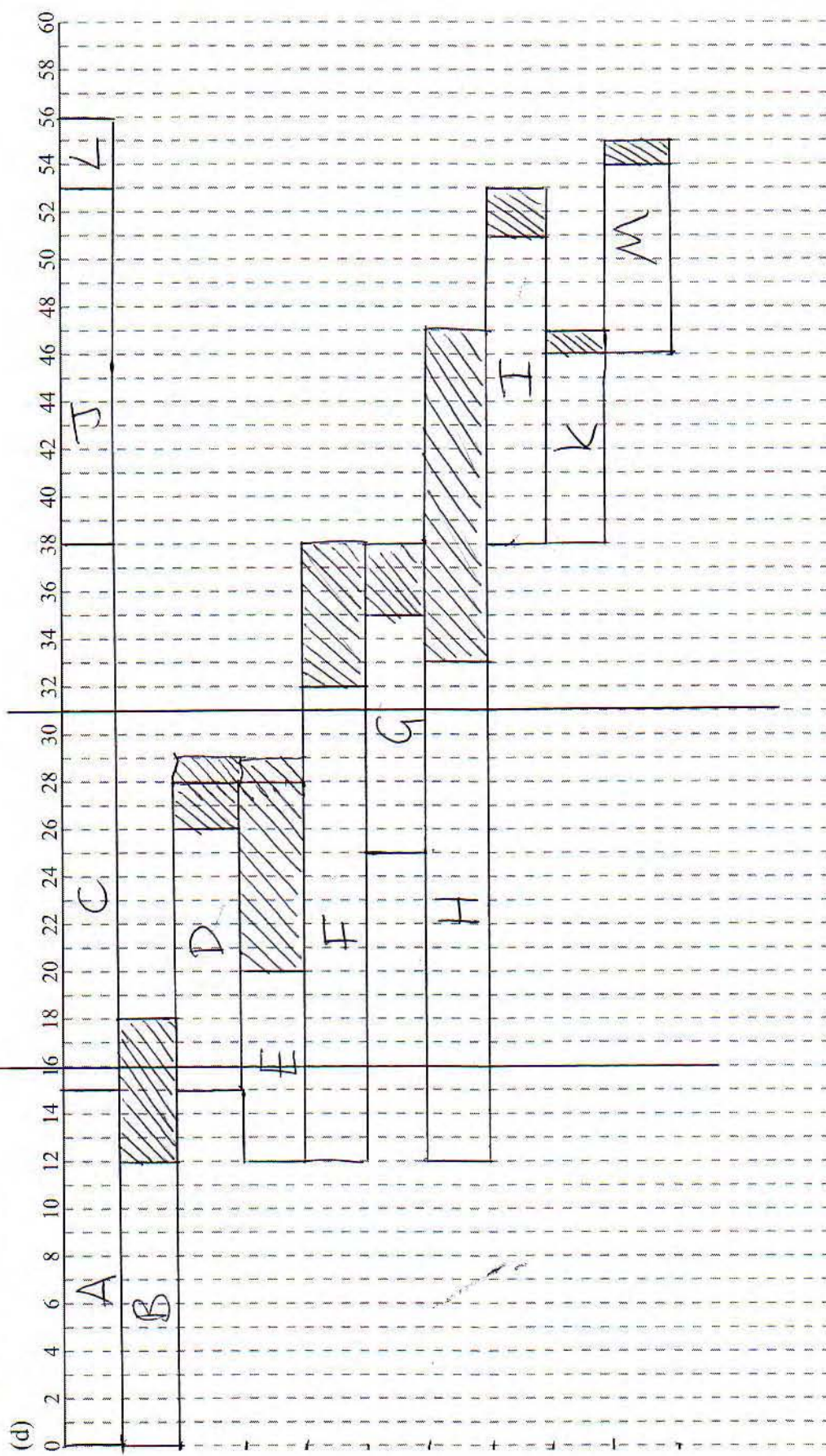
$H: 47 - 21 - 12 = 14$



8

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(Question 8 continued)



(e) Day 16 C, F, G, H
 Day 31 C, F, G, H

(Total 15 marks)

TOTAL FOR PAPER: 75 MARKS

END

Q8

