

Paper Reference 9FM0/3D
Pearson Edexcel
Level 3 GCE

Further Mathematics
Advanced
PAPER 3D: Decision Mathematics 1

Friday 20 June 2025 – Afternoon
Time: 1 hour 30 minutes

Diagram Booklet

THIS DOCUMENT MUST BE RETURNED TO PEARSON
AT THE END OF THE EXAMINATION.

In the boxes below, write your name, centre number and
candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There are two copies of all diagrams.

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Diagram 1

a	b	c	d

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Diagram 1 continued.

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Diagram 2

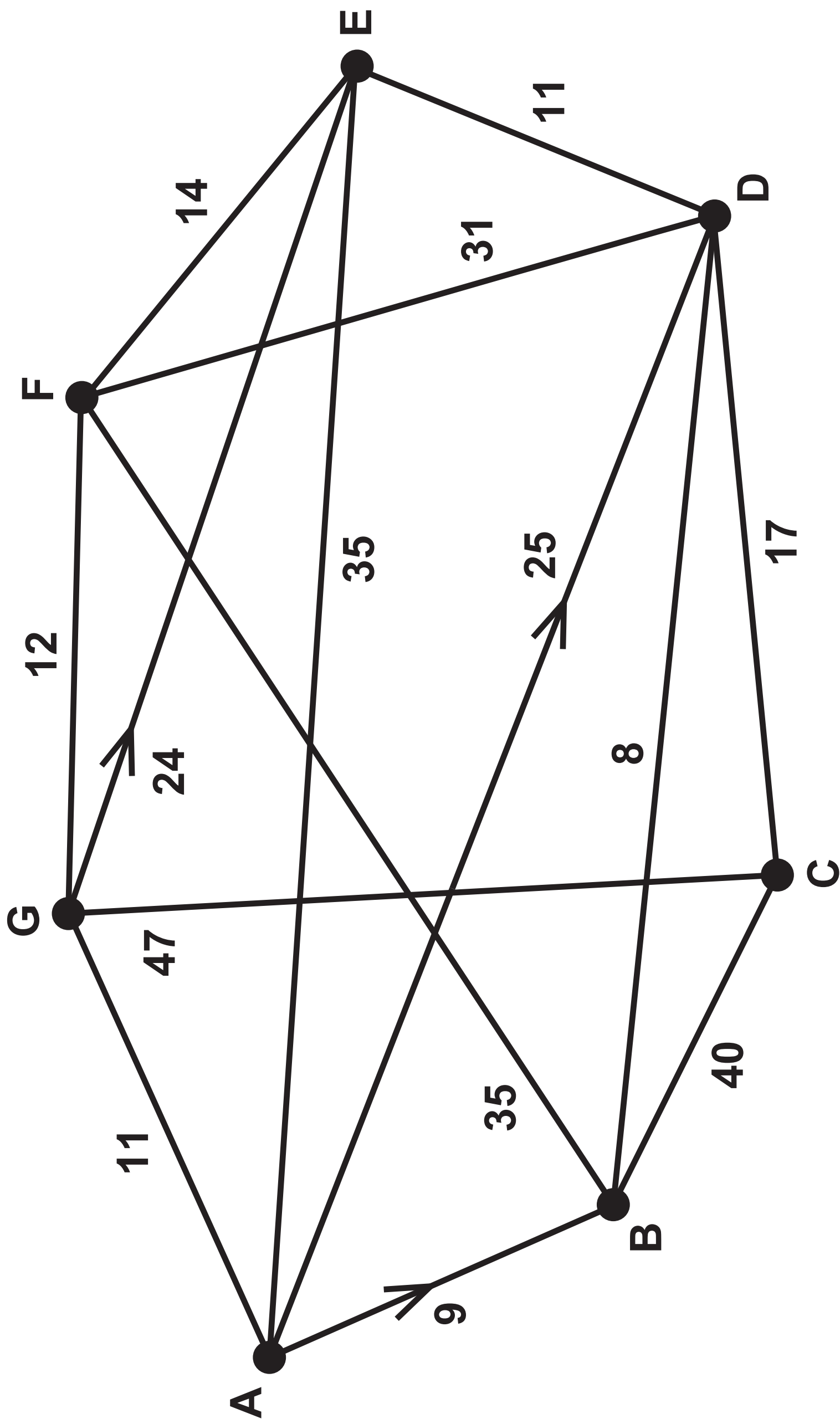


Diagram 3

	A	B	C	D	E	F	G
A	-	9	49	17	35	44	11
B	∞	-	40	8	∞	35	87
C	∞	40	-	17	∞	75	47
D	∞	8	17	-	11	31	64
E	35	44	84	11	-	14	46
F	∞	35	75	31	14	-	12
G	11	20	47	28	24	12	-

Diagram 4

	A	B	C	D	E	F	G
A	-	9	34	17	28	23	11
B	54	-	25	8	19	33	45
C	58	25	-	17	28	42	47
D	46	8	17	-	11	25	37
E	35	19	28	11	-	14	26
F	23	32	42	25	14	-	12
G	11	20	45	28	24	12	-

Diagram 5

[The total weight of the network is 268]

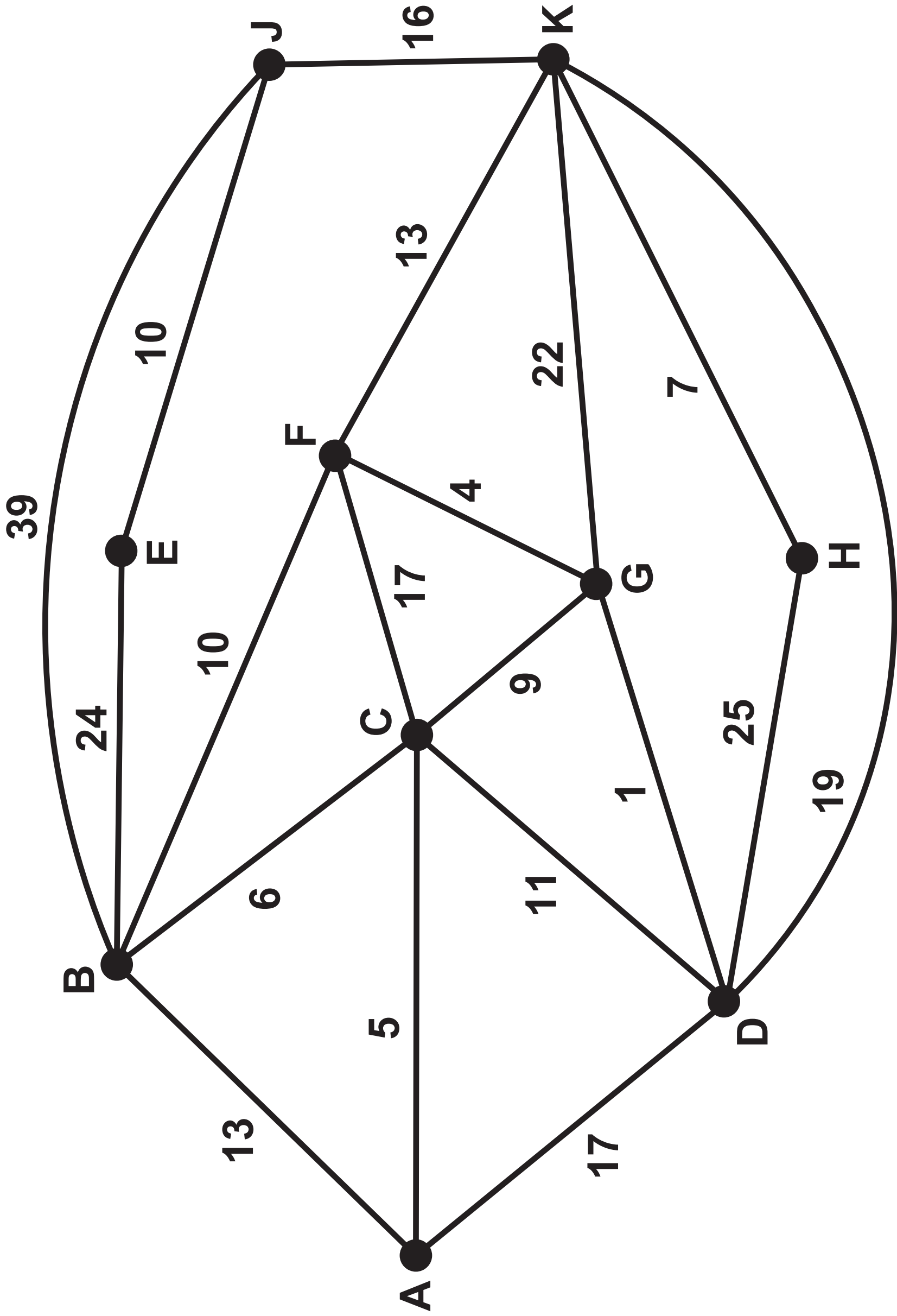
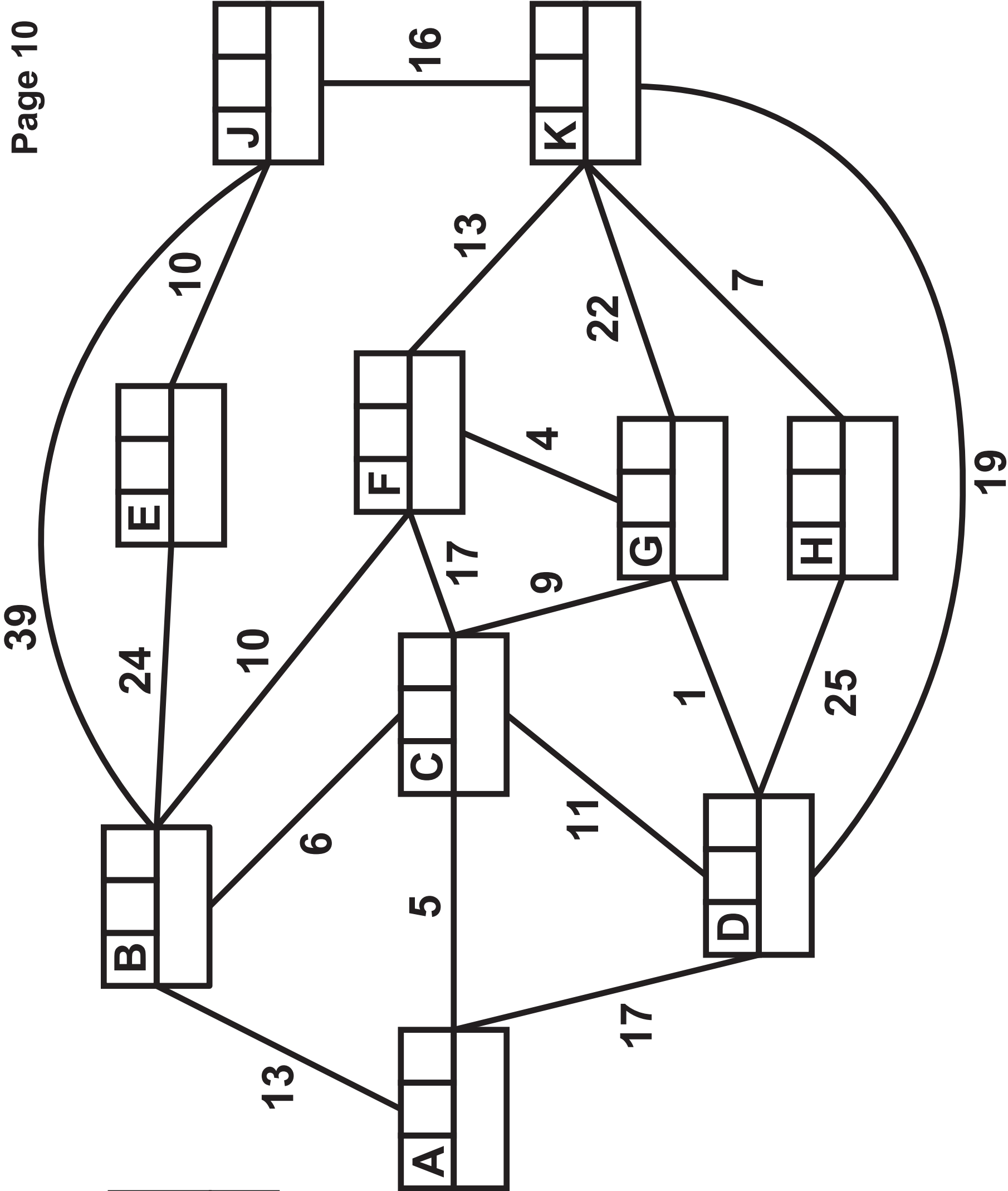


Diagram 6

KEY:

Vertex	Order of labelling	Final value
Working value		



Shortest route from J to K via A: _____

Length of shortest route from J to K via A: _____

b.v.	X	Y	Z	s ₁	s ₂	s ₃	Value
X	1	0	$-\frac{3}{4}$	$\frac{1}{8}$	0	$-\frac{1}{4}$	$\frac{5}{8}$
s ₂	0	0	$\frac{9}{4}$	$\frac{1}{8}$	1	$\frac{3}{4}$	$\frac{117}{8}$
Y	0	1	$-\frac{1}{4}$	$\frac{3}{8}$	0	$\frac{1}{4}$	$\frac{63}{8}$
Q	0	0	$-\frac{5}{4}$	$\frac{15}{8}$	0	$\frac{1}{4}$	$\frac{267}{8}$

Diagram 8

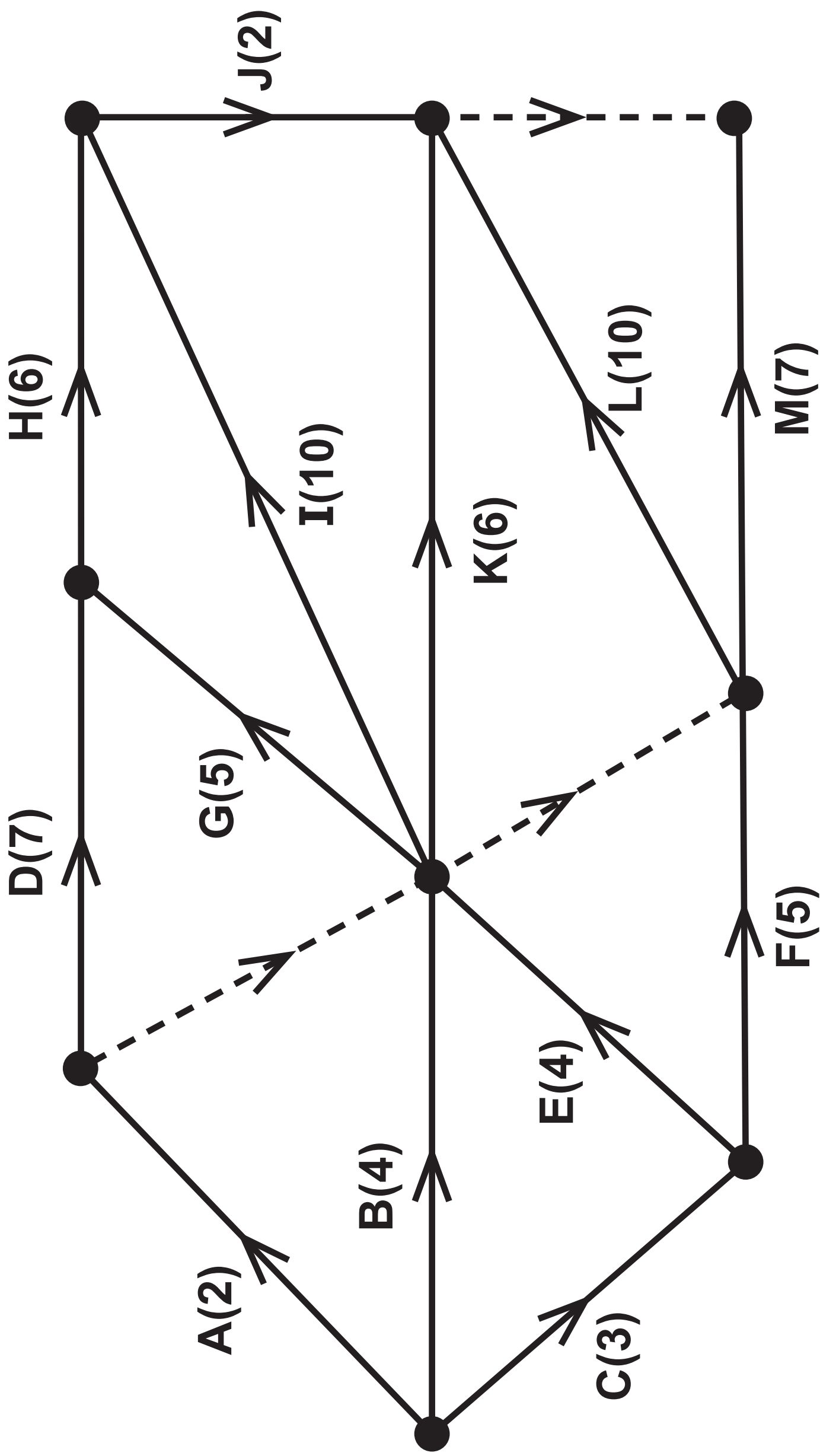


Diagram 9

KEY:

Early event time	Late event time
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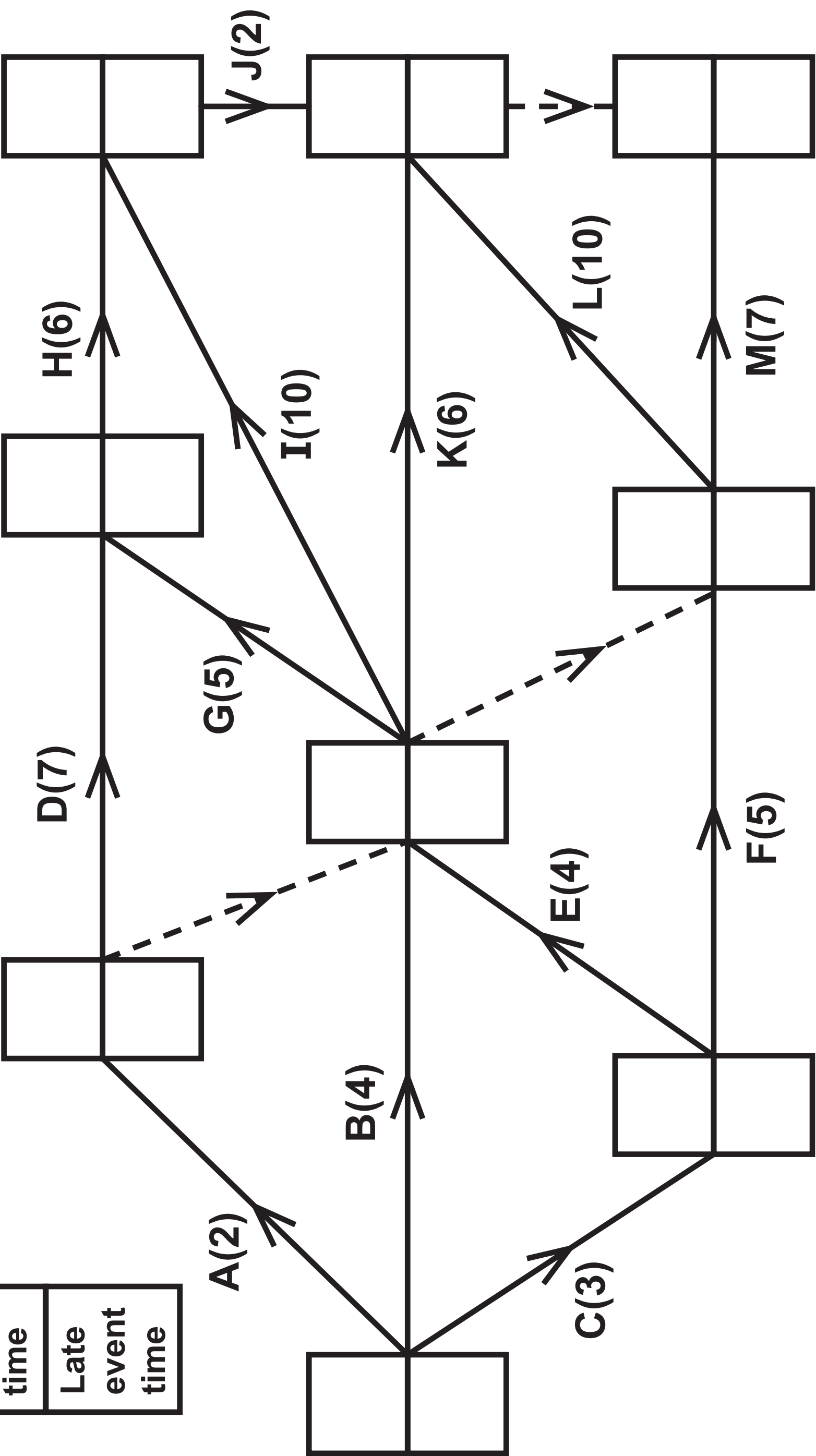


Diagram 10

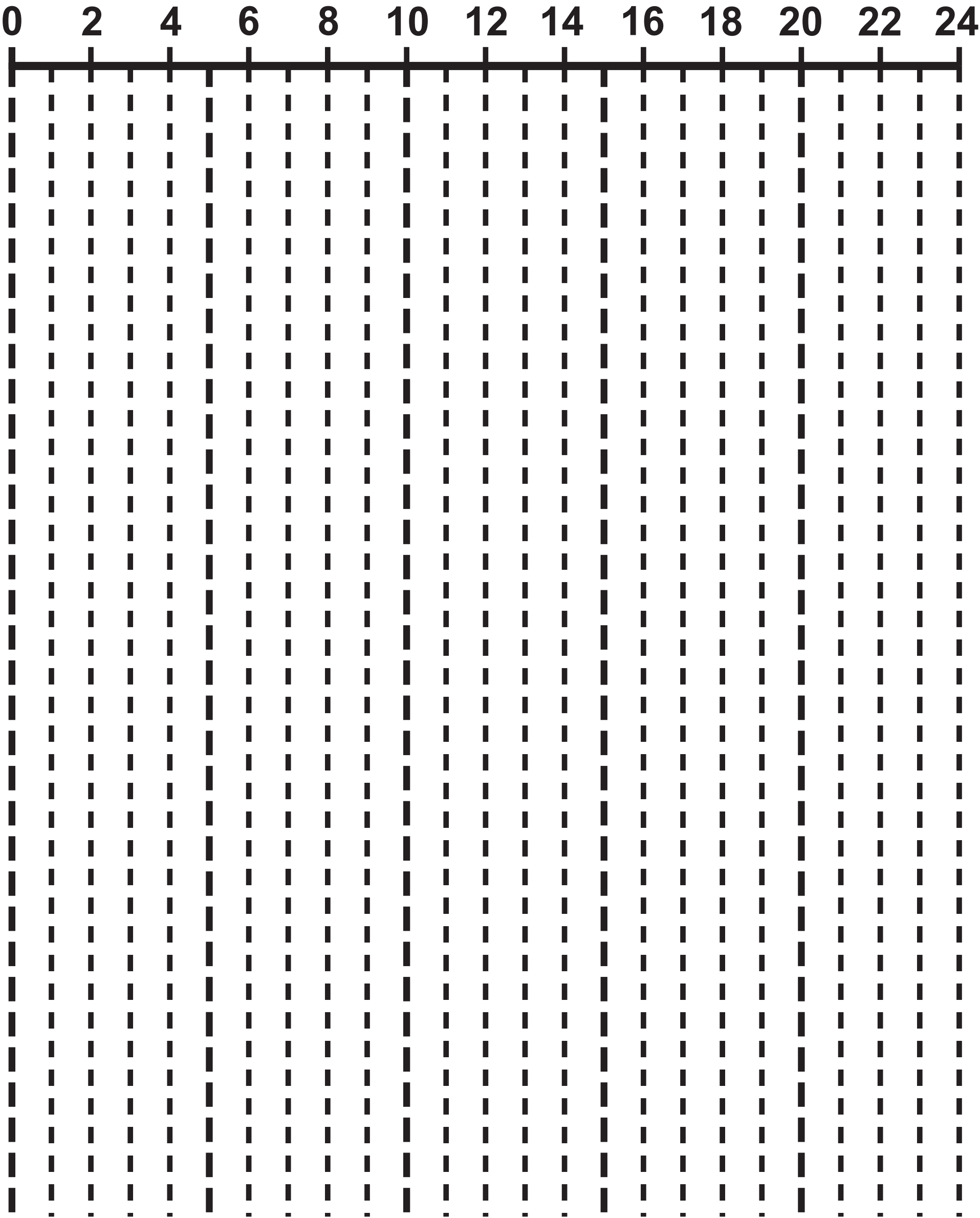


Diagram 11

Number of workers

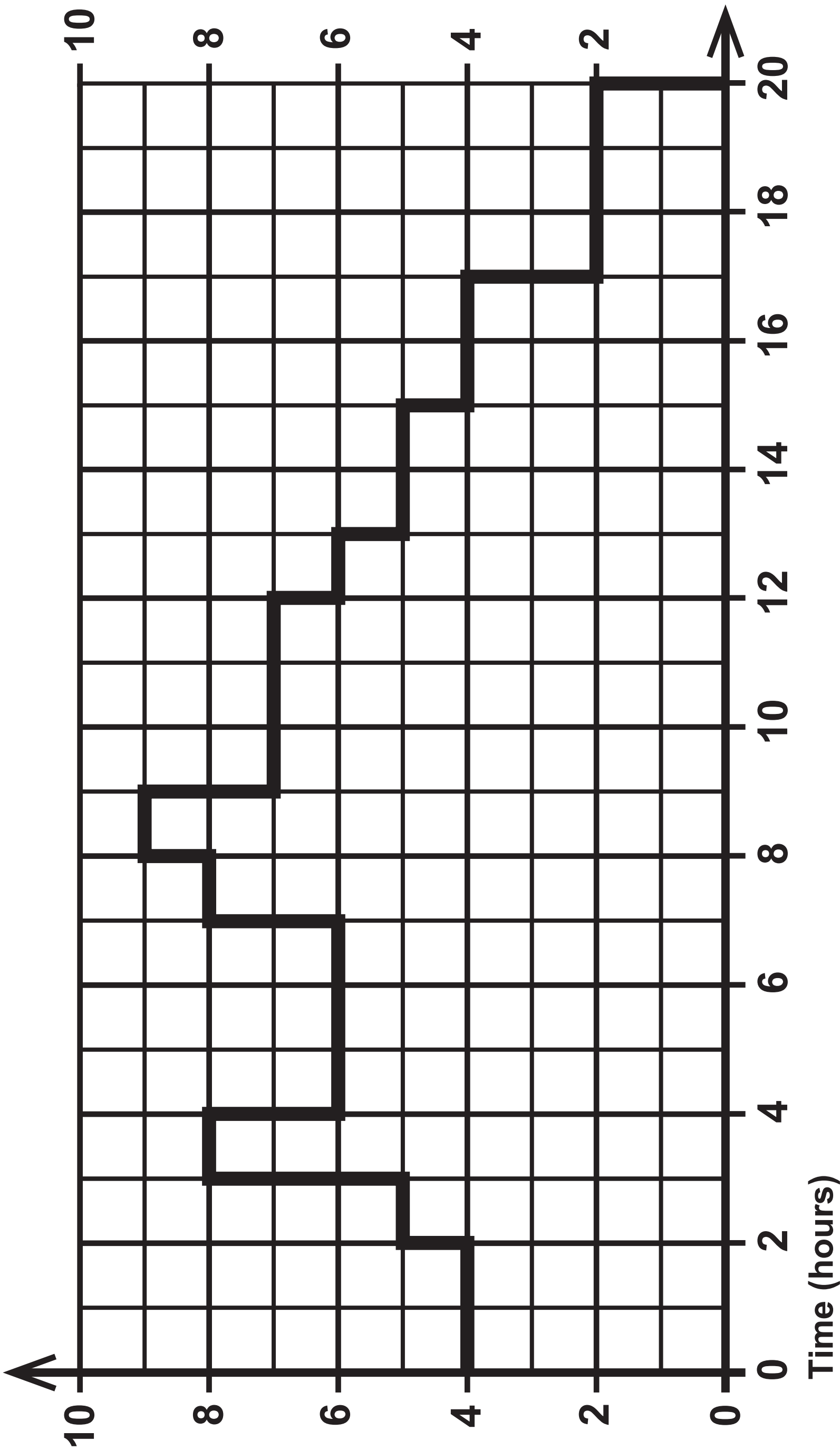


Diagram 12

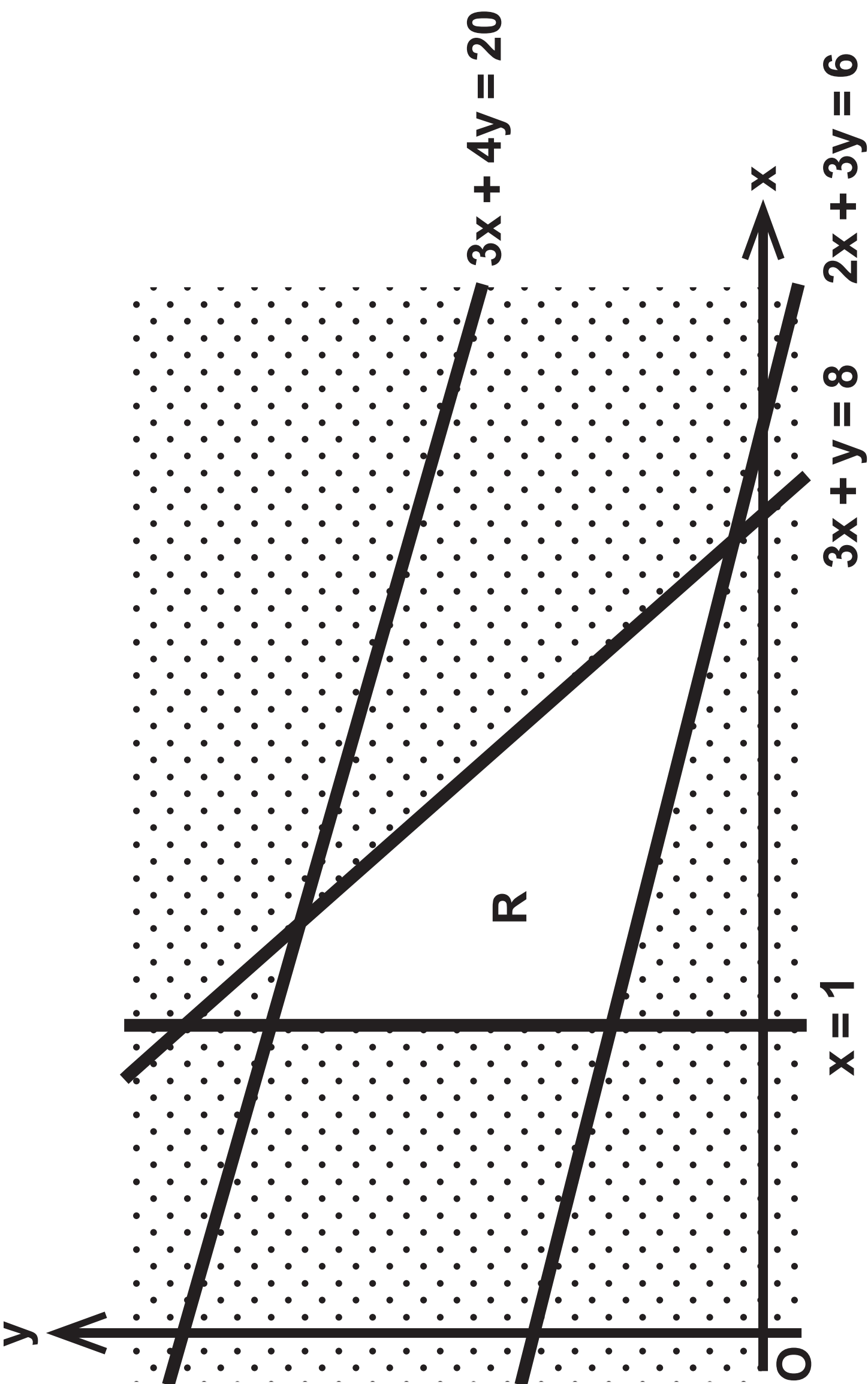


Diagram 13

b.v.	x	y	s ₁	s ₂	s ₃	s ₄	a ₁	a ₂	Value
s ₁	0	0	1	0	$\frac{9}{7}$	$-\frac{1}{7}$	0	$-\frac{9}{7}$	$\frac{78}{7}$
x	1	0	0	0	$\frac{1}{7}$	$\frac{3}{7}$	0	$-\frac{1}{7}$	$\frac{18}{7}$
y	0	1	0	0	$-\frac{3}{7}$	$-\frac{2}{7}$	0	$\frac{3}{7}$	$\frac{2}{7}$
s ₂	0	0	0	1	$\frac{1}{7}$	$\frac{3}{7}$	-1	$-\frac{1}{7}$	$\frac{11}{7}$
P	0	0	0	0	$\frac{11}{7} - \frac{3}{7}k$	$\frac{33}{7} - \frac{2}{7}k$	M	$M - \frac{11}{7} + \frac{3}{7}k$	$\frac{198}{7} + \frac{2}{7}k$

Diagram 1 – spare copy

a	b	c	d

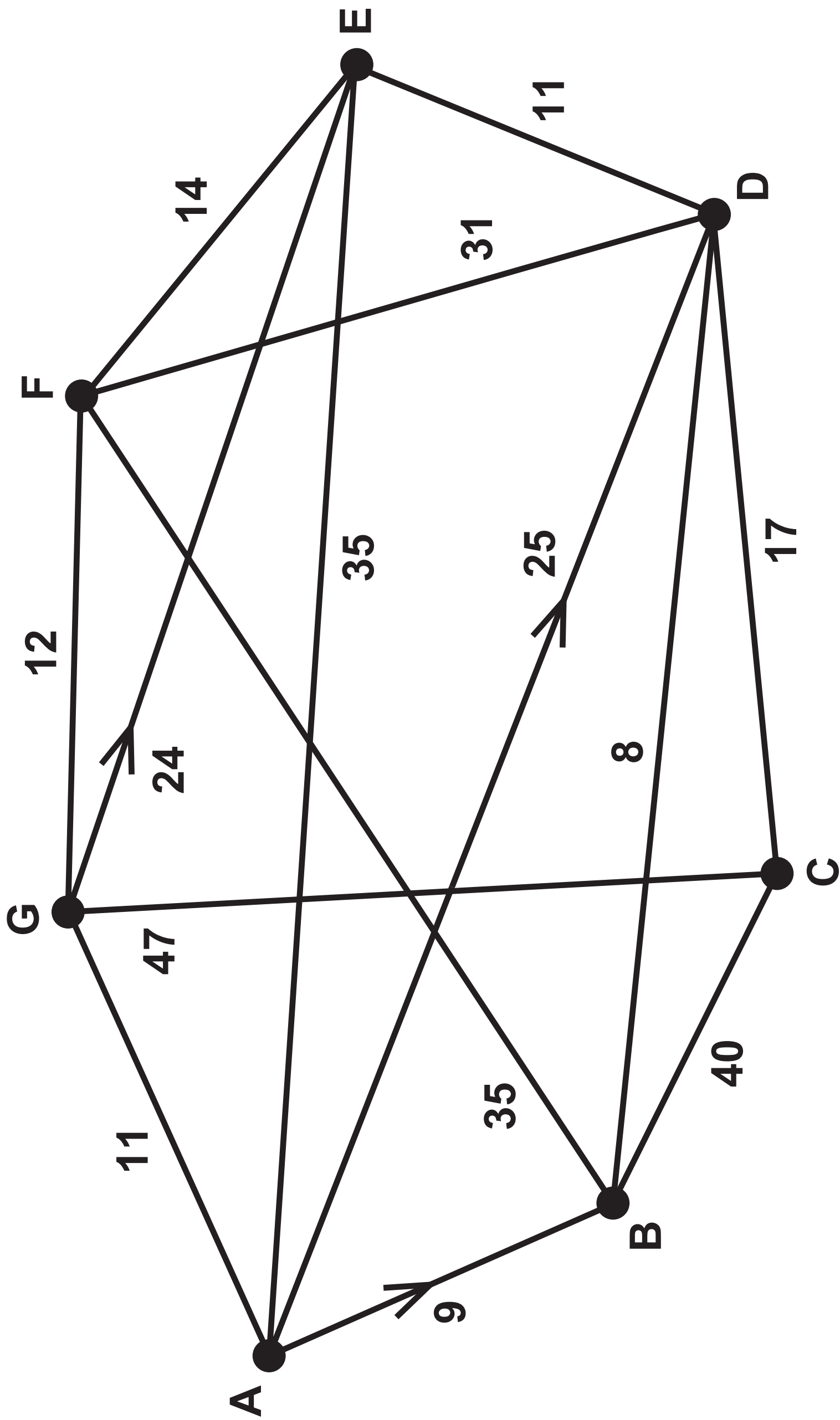
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Diagram 1 – spare copy continued.

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Diagram 2 – spare copy



	A	B	C	D	E	F	G
A	-	9	49	17	35	44	11
B	∞	-	40	8	∞	35	87
C	∞	40	-	17	∞	75	47
D	∞	8	17	-	11	31	64
E	35	44	84	11	-	14	46
F	∞	35	75	31	14	-	12
G	11	20	47	28	24	12	-

Diagram 4 – spare copy

	A	B	C	D	E	F	G
A	–	9	34	17	28	23	11
B	54	–	25	8	19	33	45
C	58	25	–	17	28	42	47
D	46	8	17	–	11	25	37
E	35	19	28	11	–	14	26
F	23	32	42	25	14	–	12
G	11	20	45	28	24	12	–

Diagram 5 – spare copy

[The total weight of the network is 268]

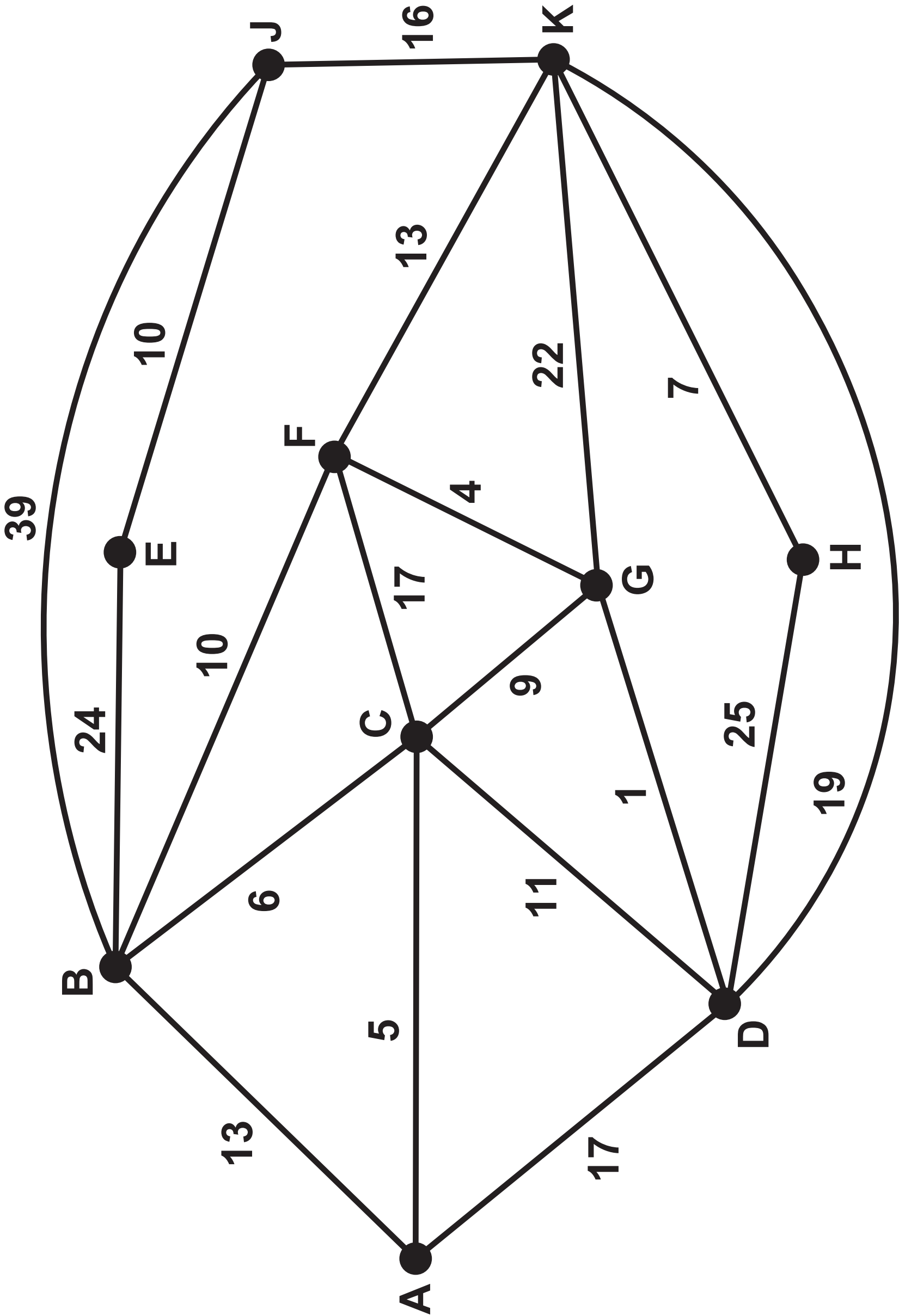
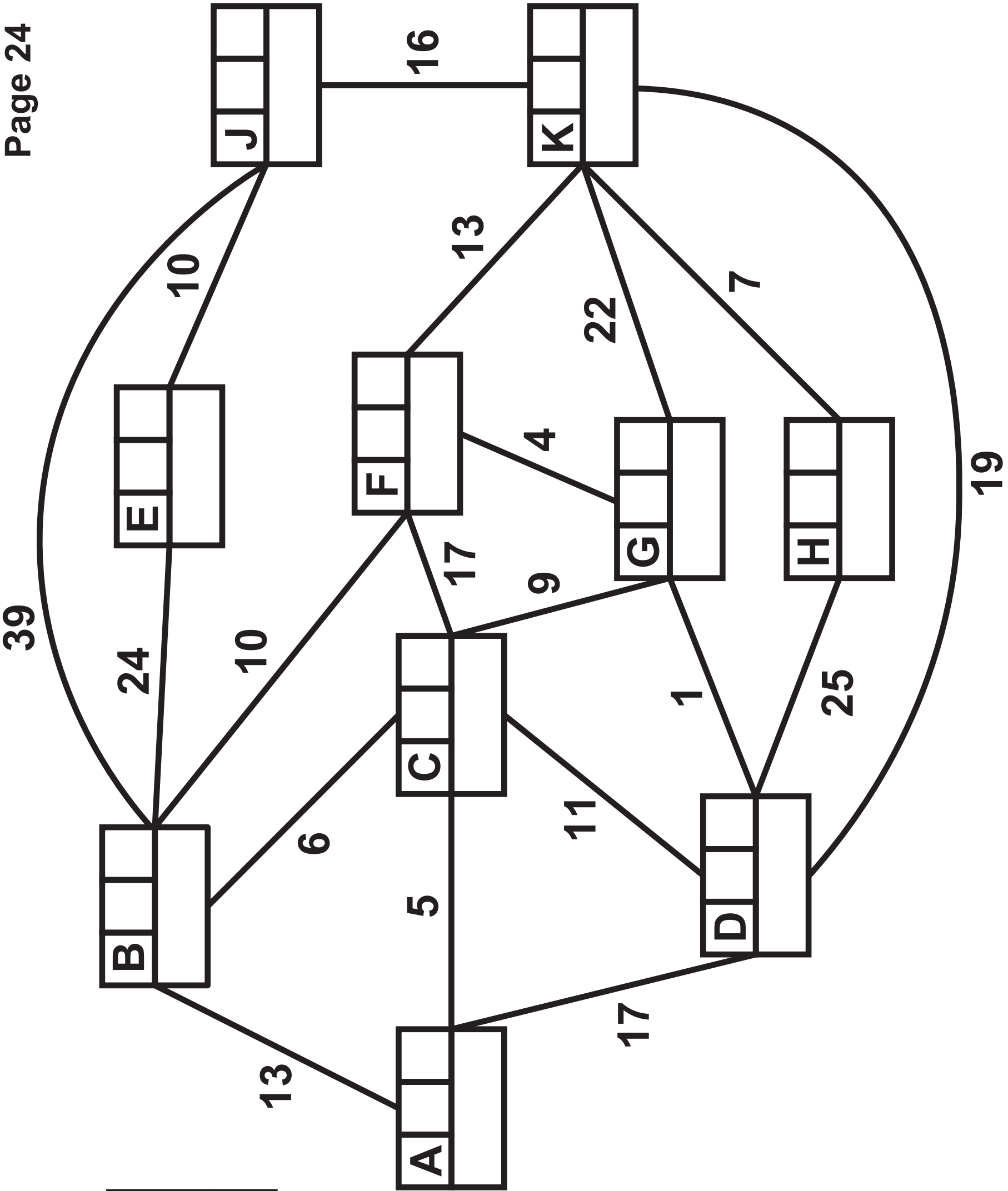


Diagram 6 – spare copy

KEY:

Vertex	Order of labelling	Final value
Working value		



Shortest route from J to K via A: _____

Length of shortest route from J to K via A: _____

Diagram 7 – spare copy

b.v.	X	Y	Z	s ₁	s ₂	s ₃	Value
X	1	0	$-\frac{3}{4}$	$\frac{1}{8}$	0	$-\frac{1}{4}$	$\frac{5}{8}$
s ₂	0	0	$\frac{9}{4}$	$\frac{1}{8}$	1	$\frac{3}{4}$	$\frac{117}{8}$
Y	0	1	$-\frac{1}{4}$	$\frac{3}{8}$	0	$\frac{1}{4}$	$\frac{63}{8}$
Q	0	0	$-\frac{5}{4}$	$\frac{15}{8}$	0	$\frac{1}{4}$	$\frac{267}{8}$

Diagram 8 – spare copy

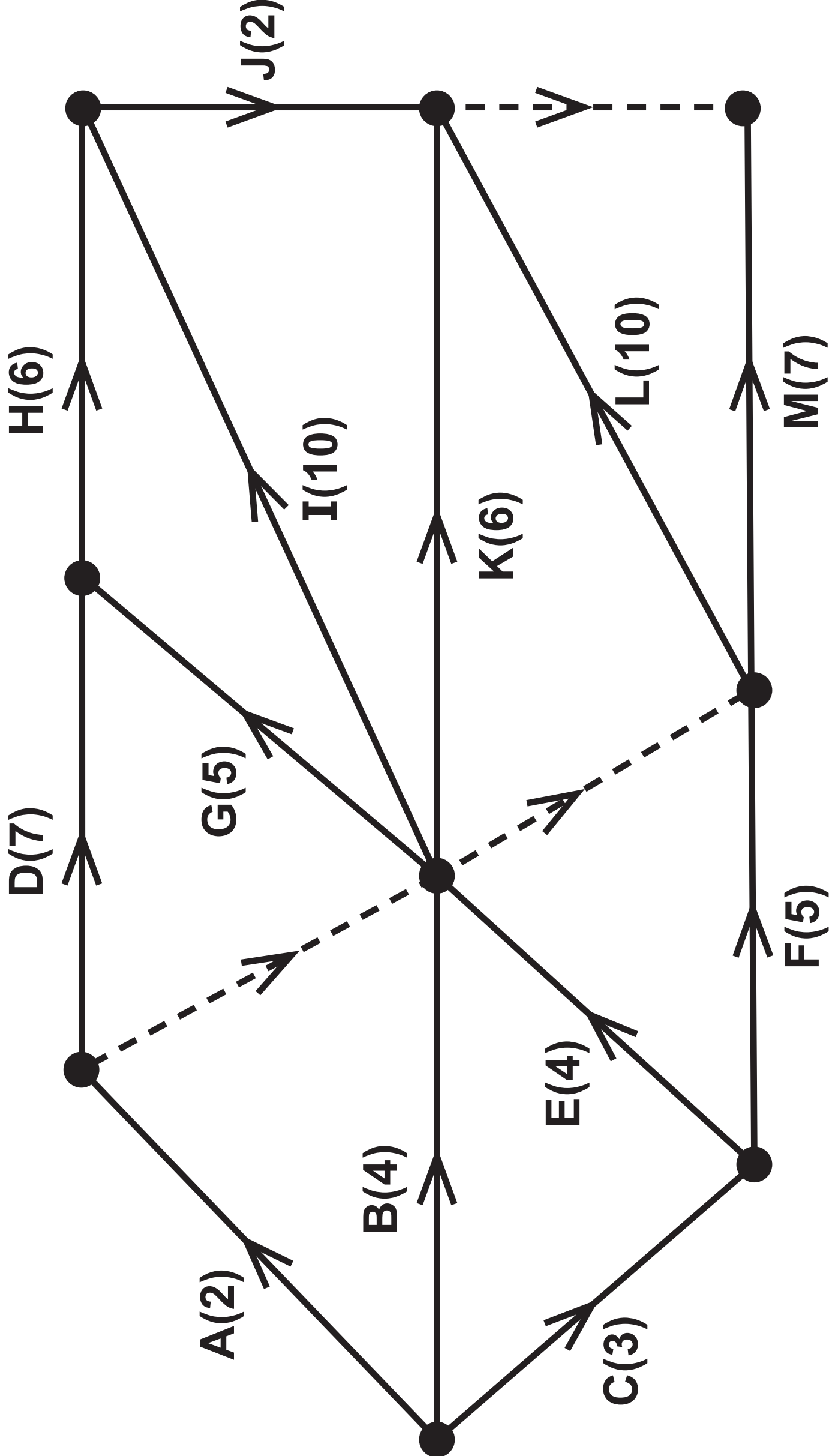


Diagram 9 – spare copy

KEY:

Early event time	Late event time
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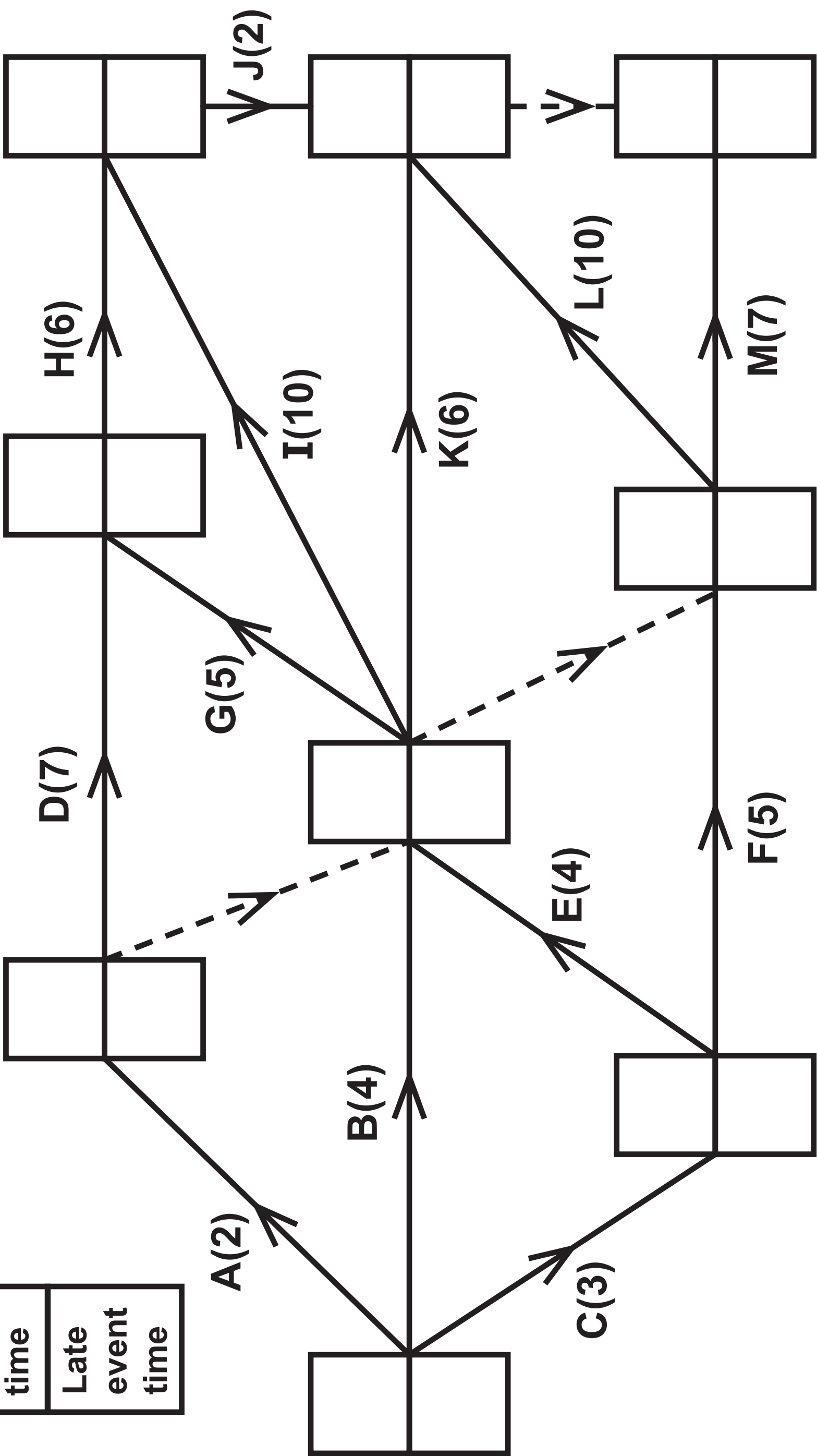


Diagram 10 – spare copy

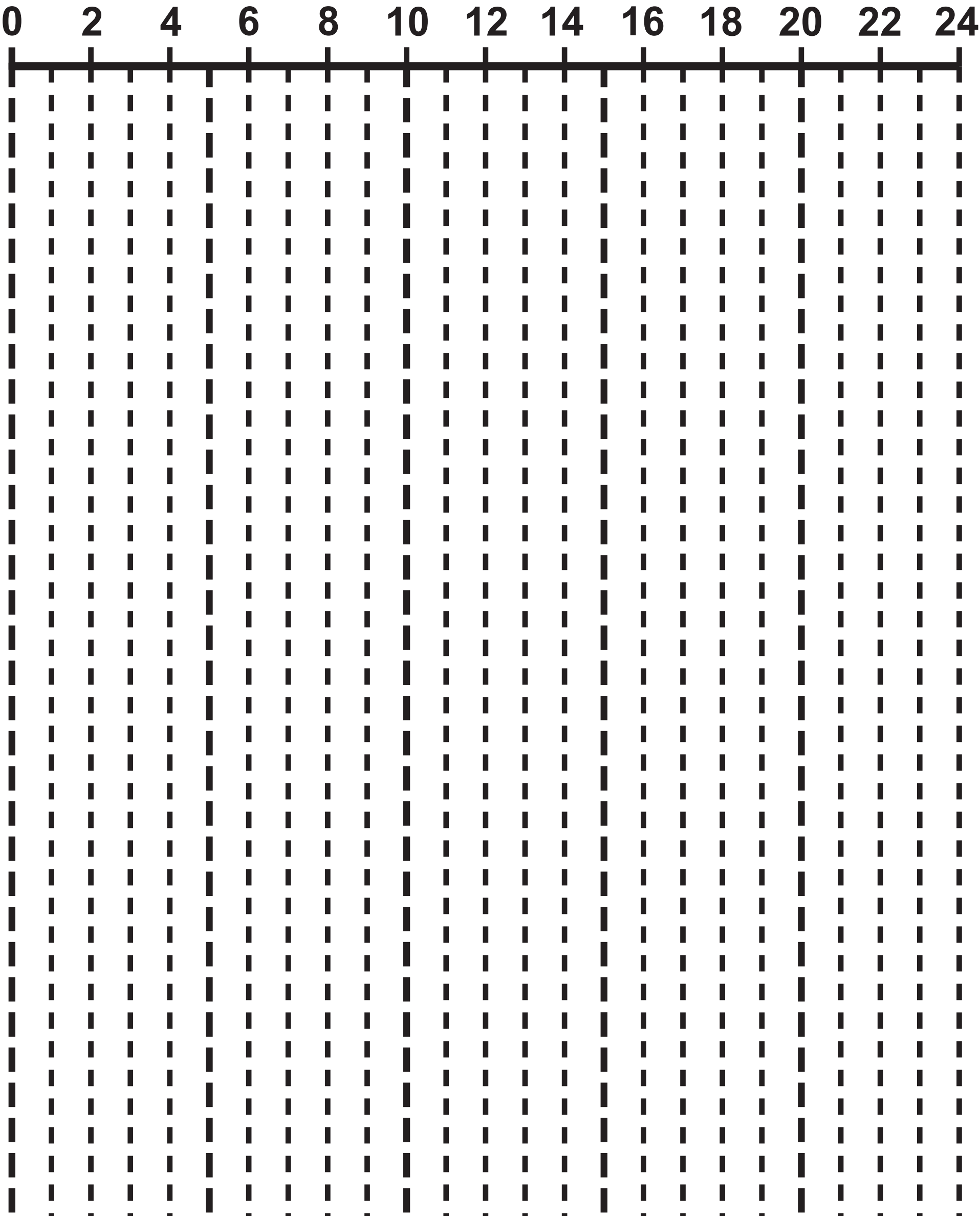


Diagram 11 – spare copy

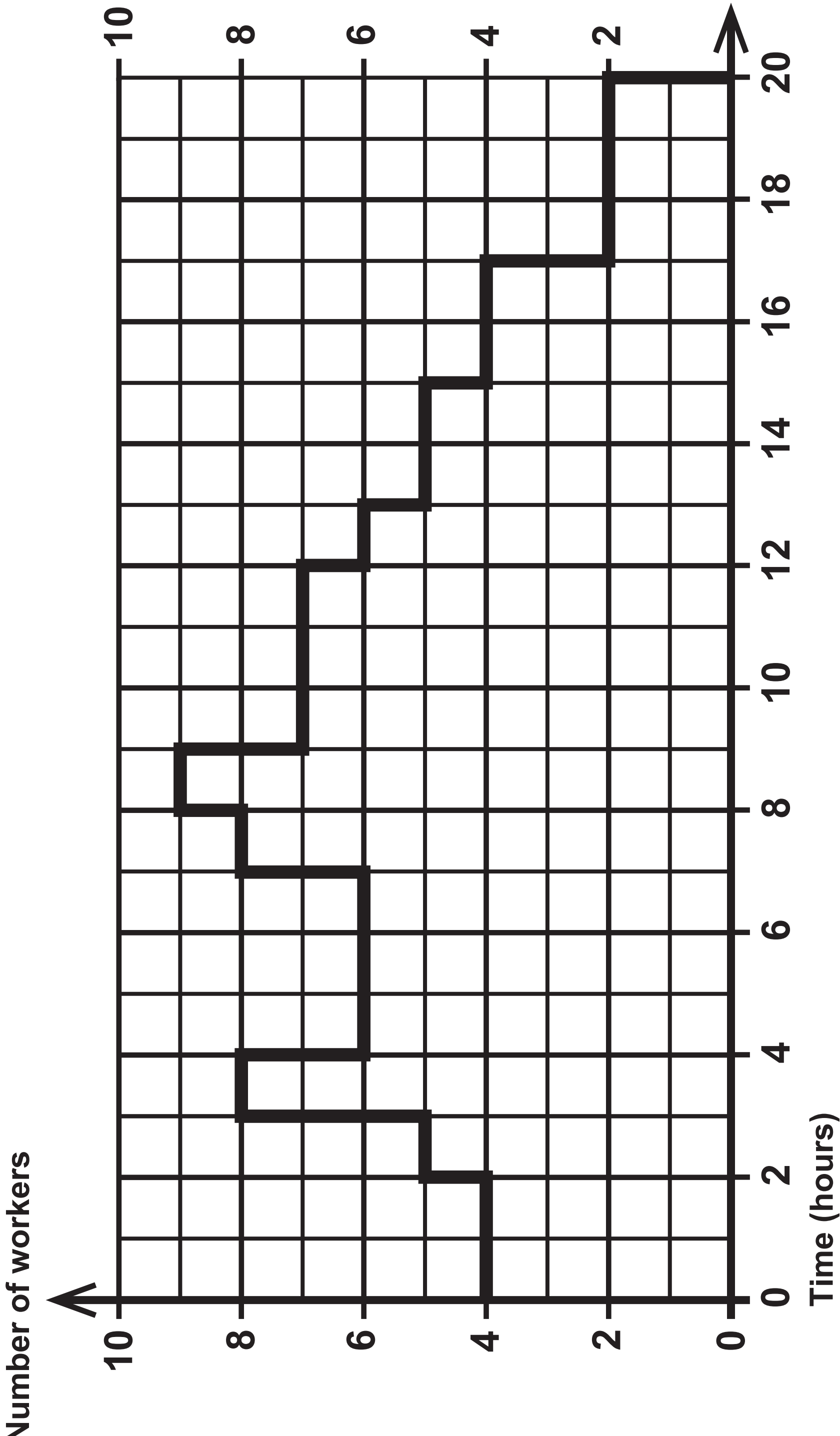


Diagram 12 – spare copy

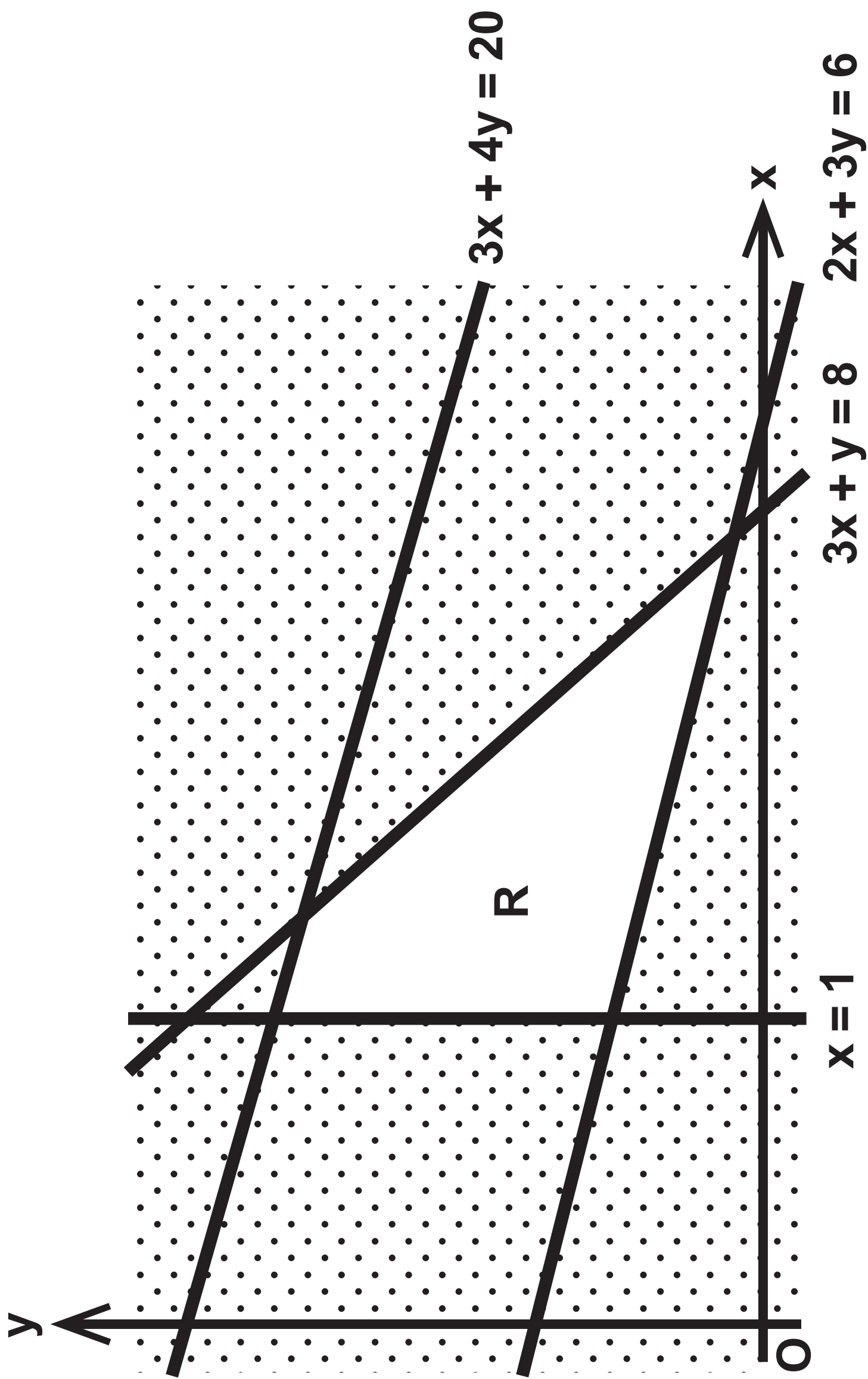


Diagram 13 – spare copy

b.v.	x	y	s ₁	s ₂	s ₃	s ₄	a ₁	a ₂	Value
s ₁	0	0	1	0	$\frac{9}{7}$	$-\frac{1}{7}$	0	$-\frac{9}{7}$	$\frac{78}{7}$
x	1	0	0	0	$\frac{1}{7}$	$\frac{3}{7}$	0	$-\frac{1}{7}$	$\frac{18}{7}$
y	0	1	0	0	$-\frac{3}{7}$	$-\frac{2}{7}$	0	$\frac{3}{7}$	$\frac{2}{7}$
s ₂	0	0	0	1	$\frac{1}{7}$	$\frac{3}{7}$	-1	$-\frac{1}{7}$	$\frac{11}{7}$
P	0	0	0	0	$\frac{11}{7} - \frac{3}{7}k$	$\frac{33}{7} - \frac{2}{7}k$	M	$M - \frac{11}{7} + \frac{3}{7}k$	$\frac{198}{7} + \frac{2}{7}k$