

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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Turn over

Diagram 1 continued.

a	b	c	d

(continued on the next page)

Turn over

Diagram 1 continued.

a	b	c	d

Diagram 2

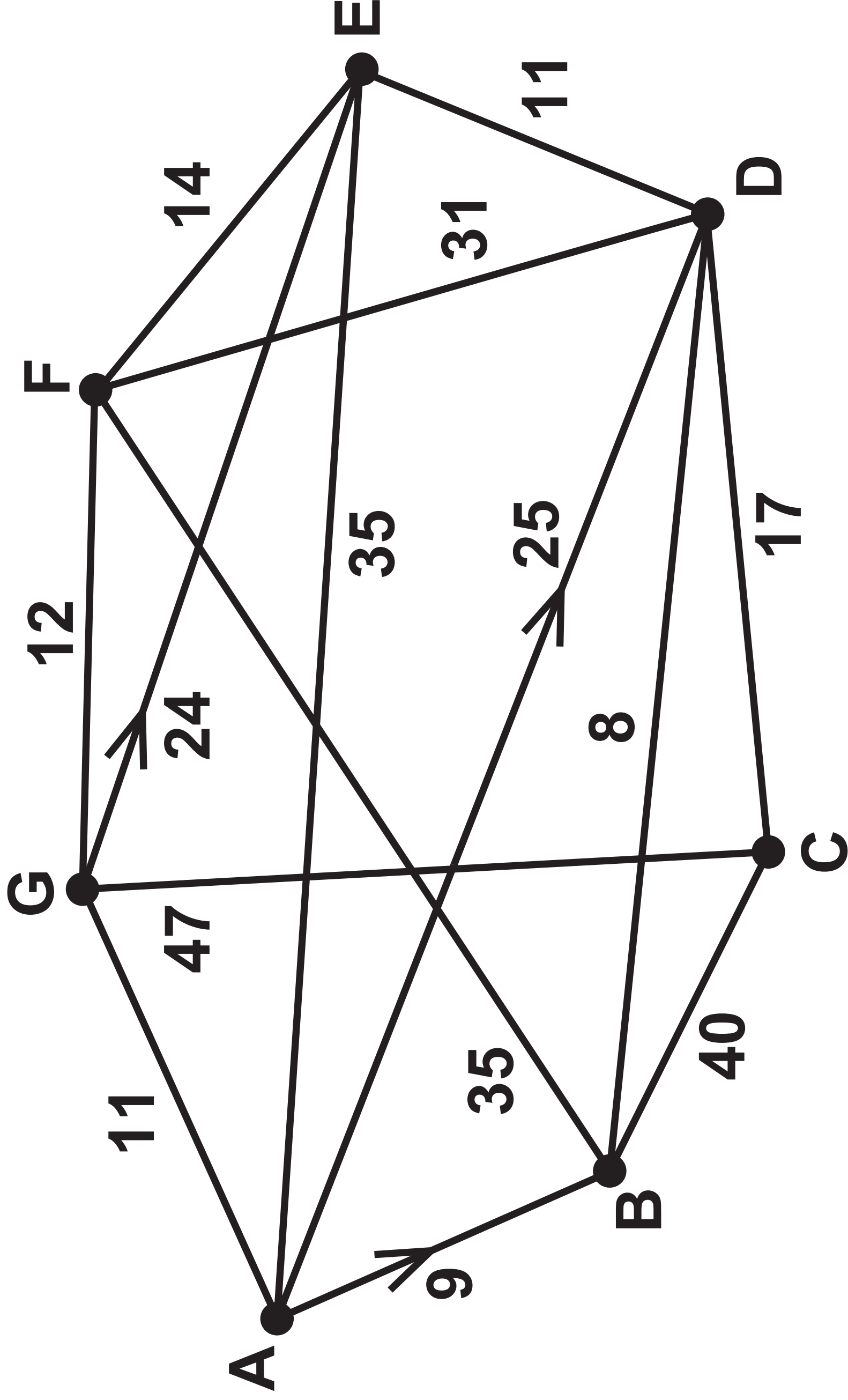


Diagram 3

	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]

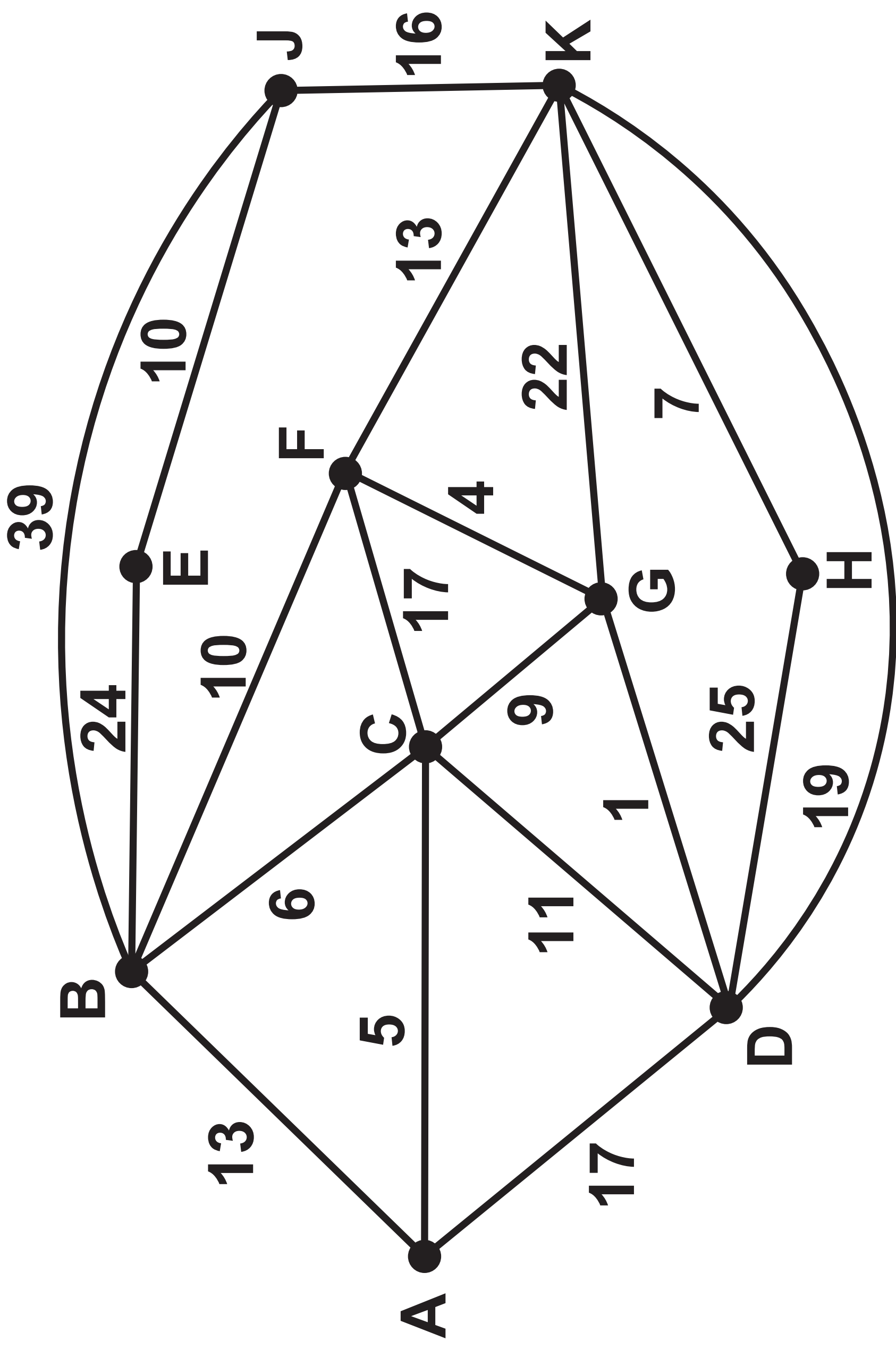


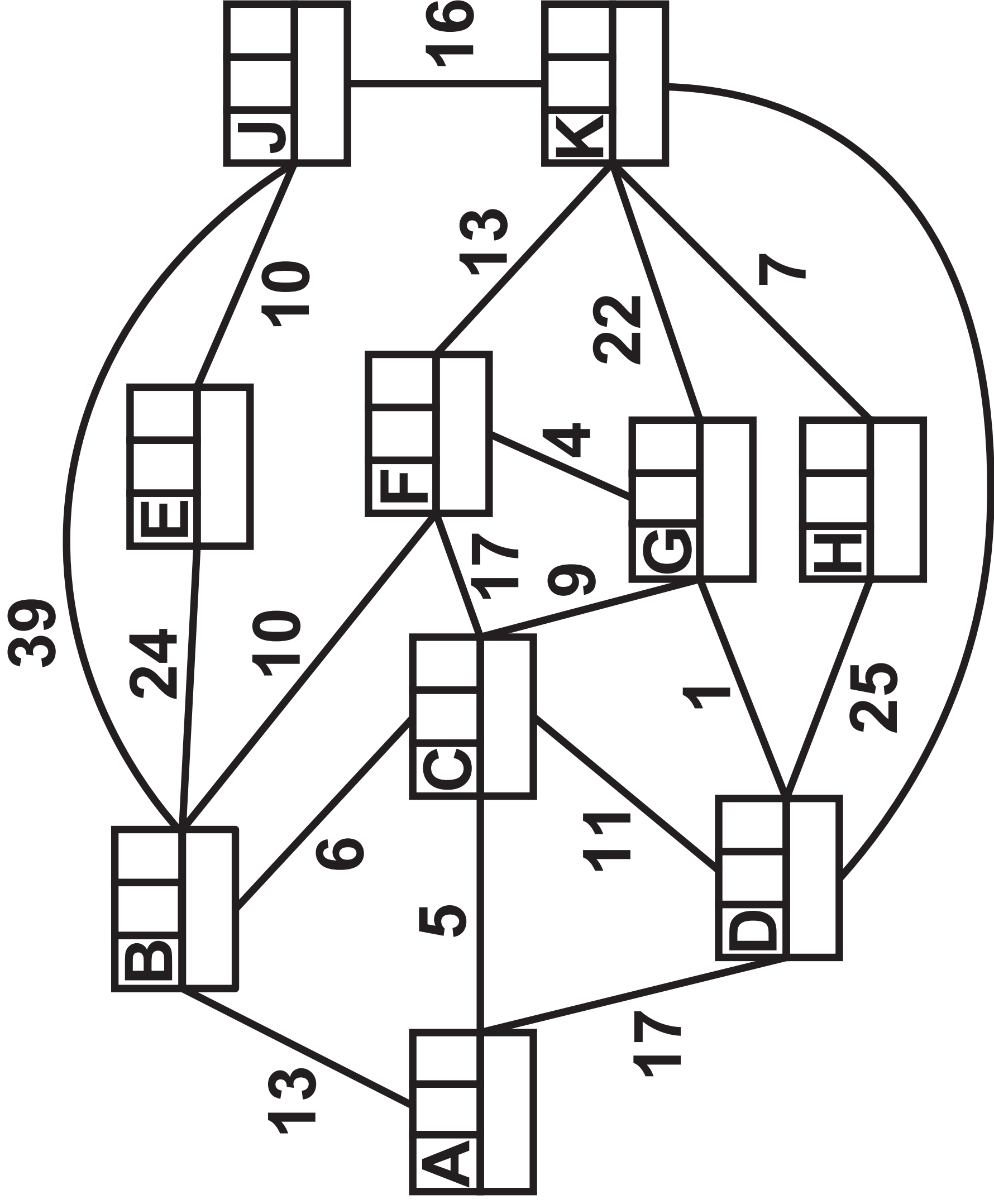
Diagram 6

KEY:

Vertex	Order of labelling	Final value
Working value		

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Diagram 6 continued.



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Diagram 6 continued.

Shortest route from J to K via A:

Length of shortest route from J to K via A:

Diagram 7

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

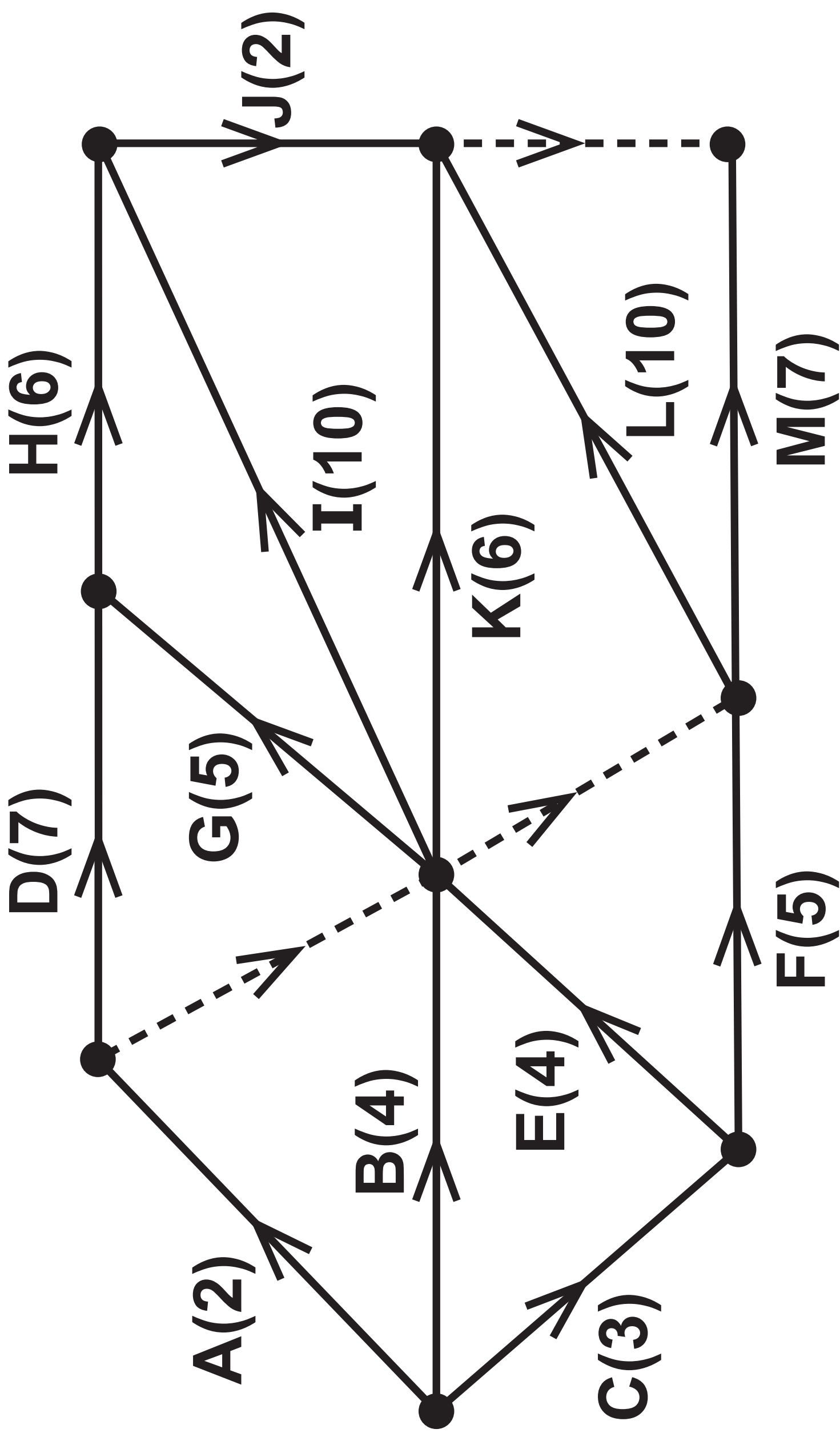


Diagram 9

KEY:

Early event time
Late event time

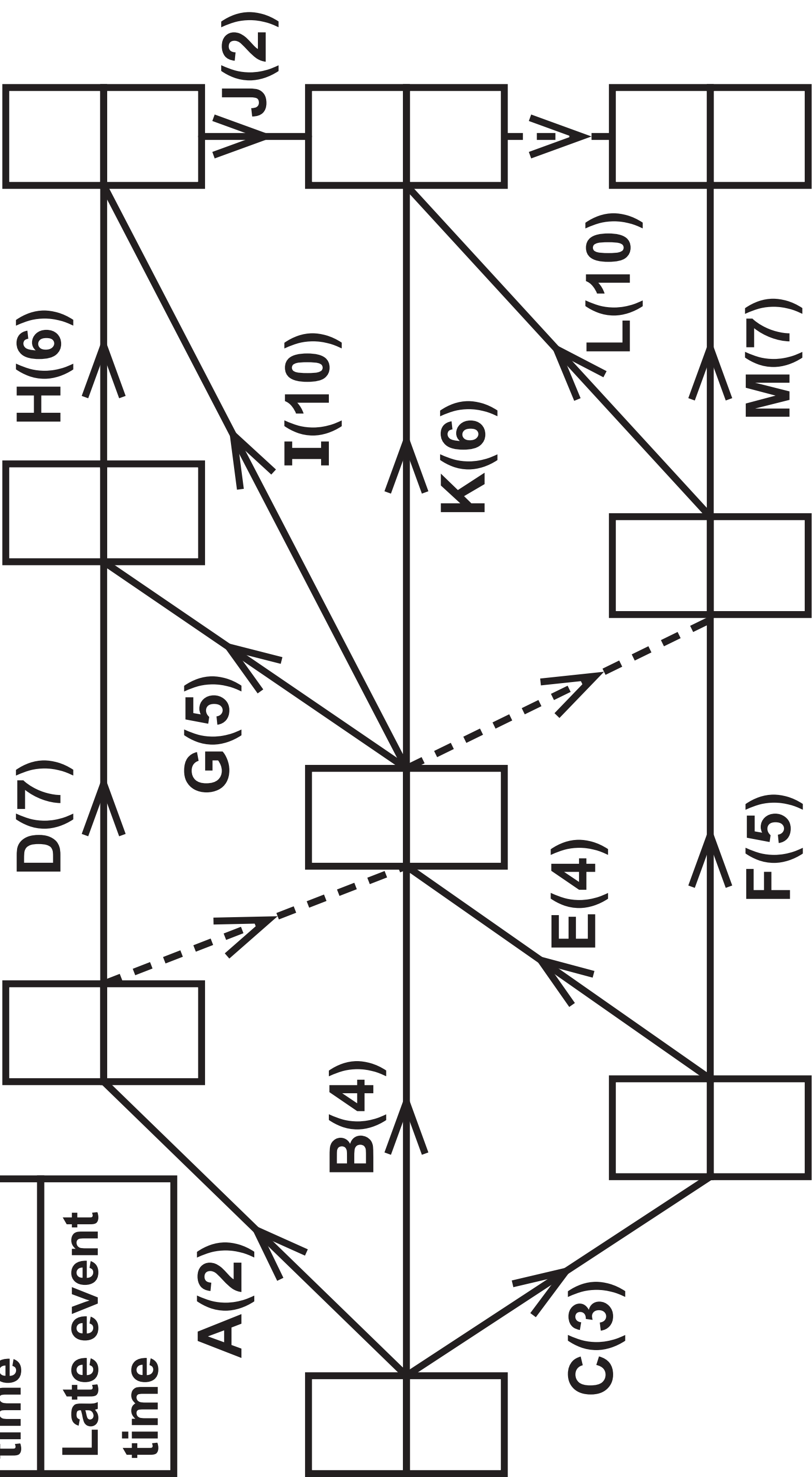


Diagram 10

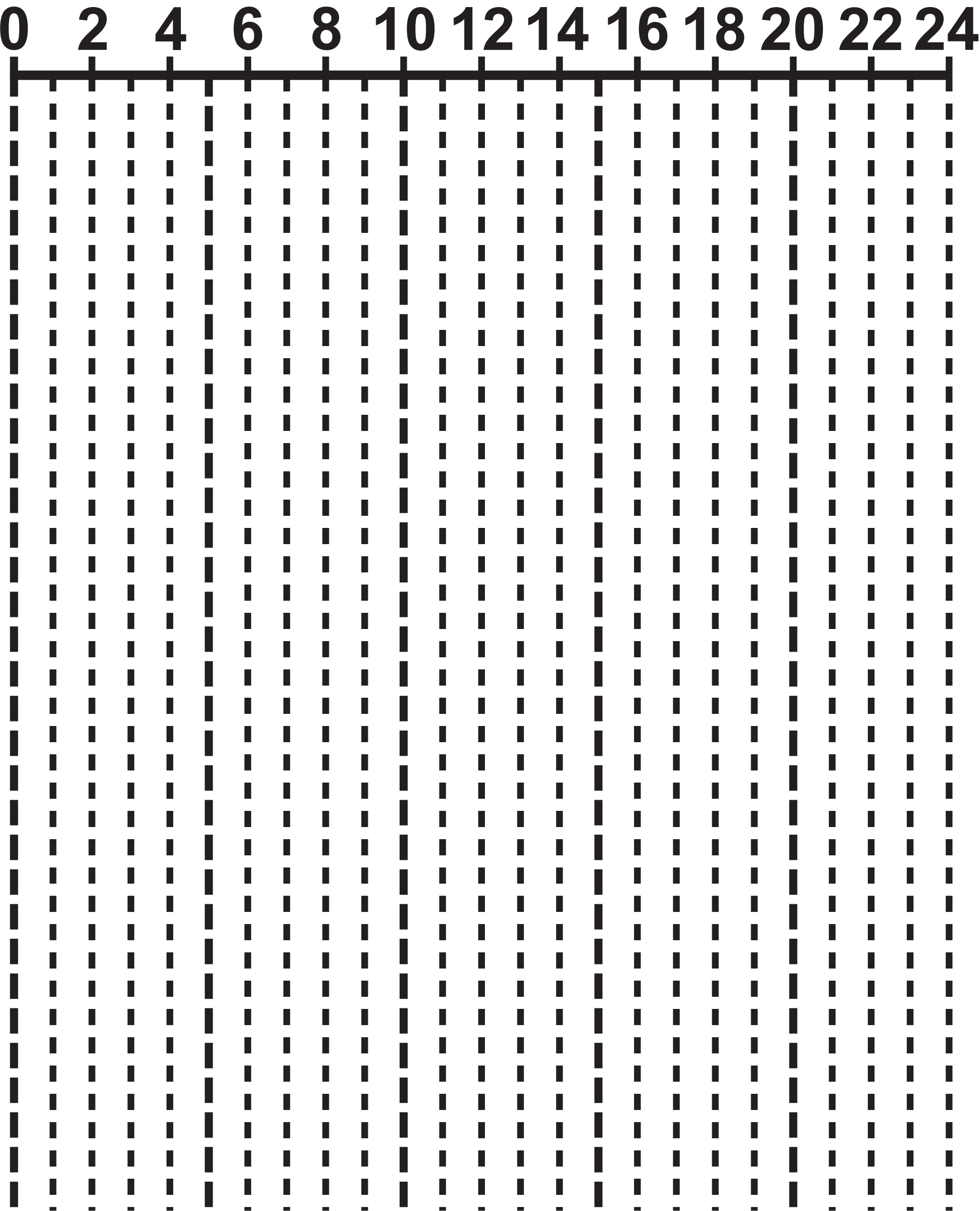


Diagram 11

Number of workers

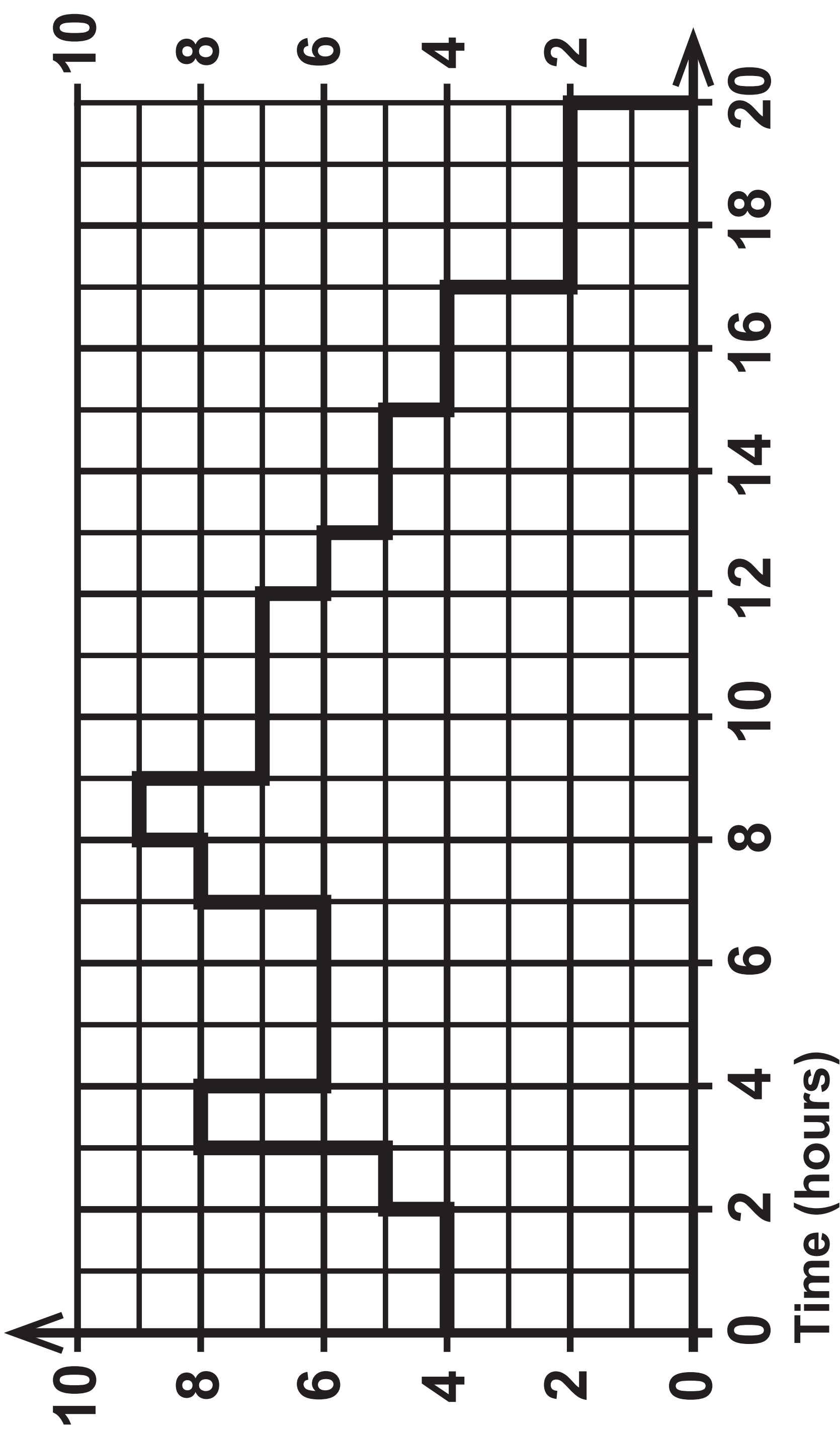


Diagram 12

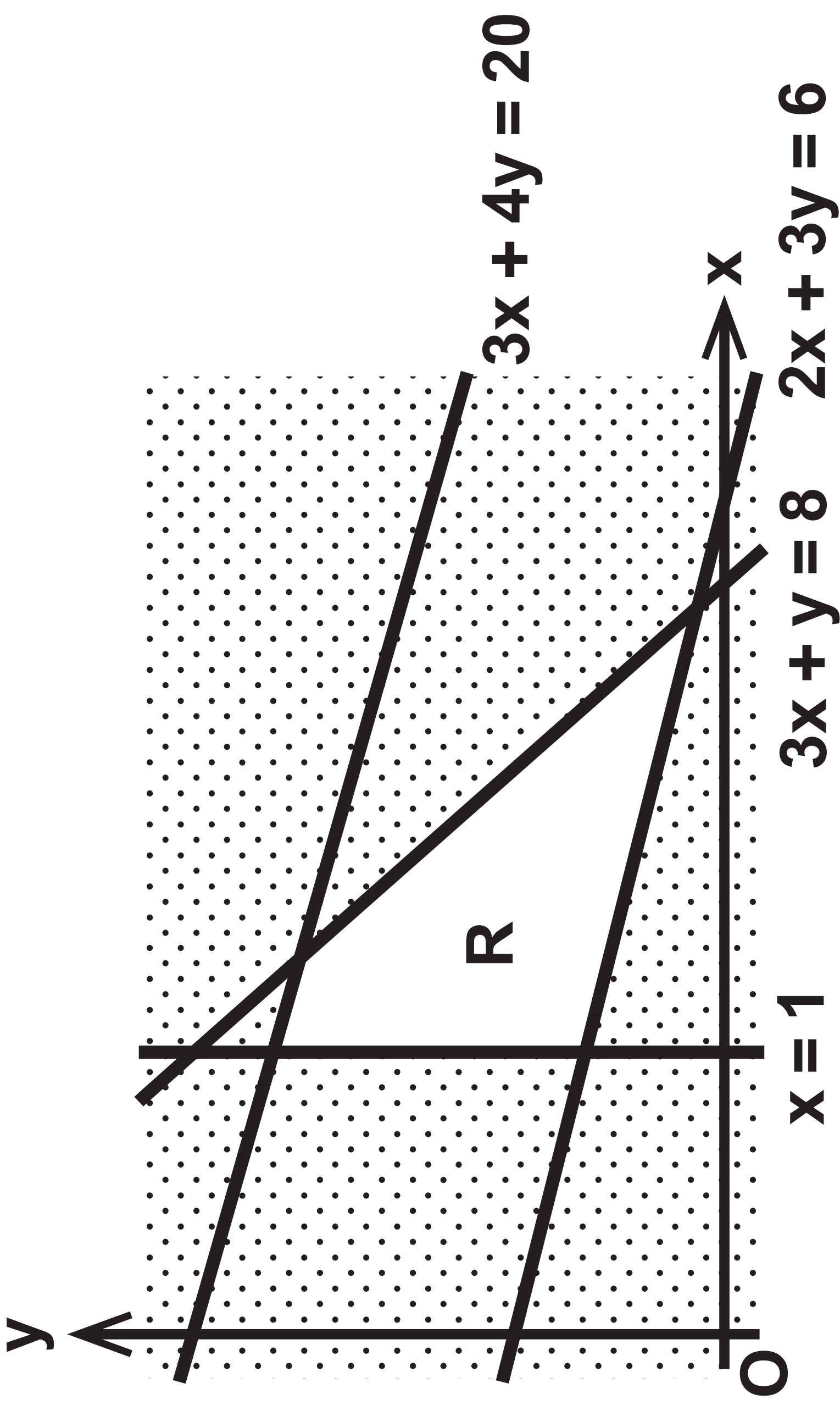


Diagram 13

b.v.	x	y	s ₁	s ₂	s ₃
s ₁	0	0	1	0	$\frac{9}{7}$
x	1	0	0	0	$\frac{1}{7}$
y	0	1	0	0	$-\frac{3}{7}$
s ₂	0	0	0	1	$\frac{1}{7}$
P	0	0	0	0	$\frac{11}{7} - \frac{3}{7}k$

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Diagram 13 continued.

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

Diagram 1 – spare copy continued.

a	b	c	d

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Turn over

Diagram 1 – spare copy continued.

a	b	c	d

Diagram 2 – spare copy

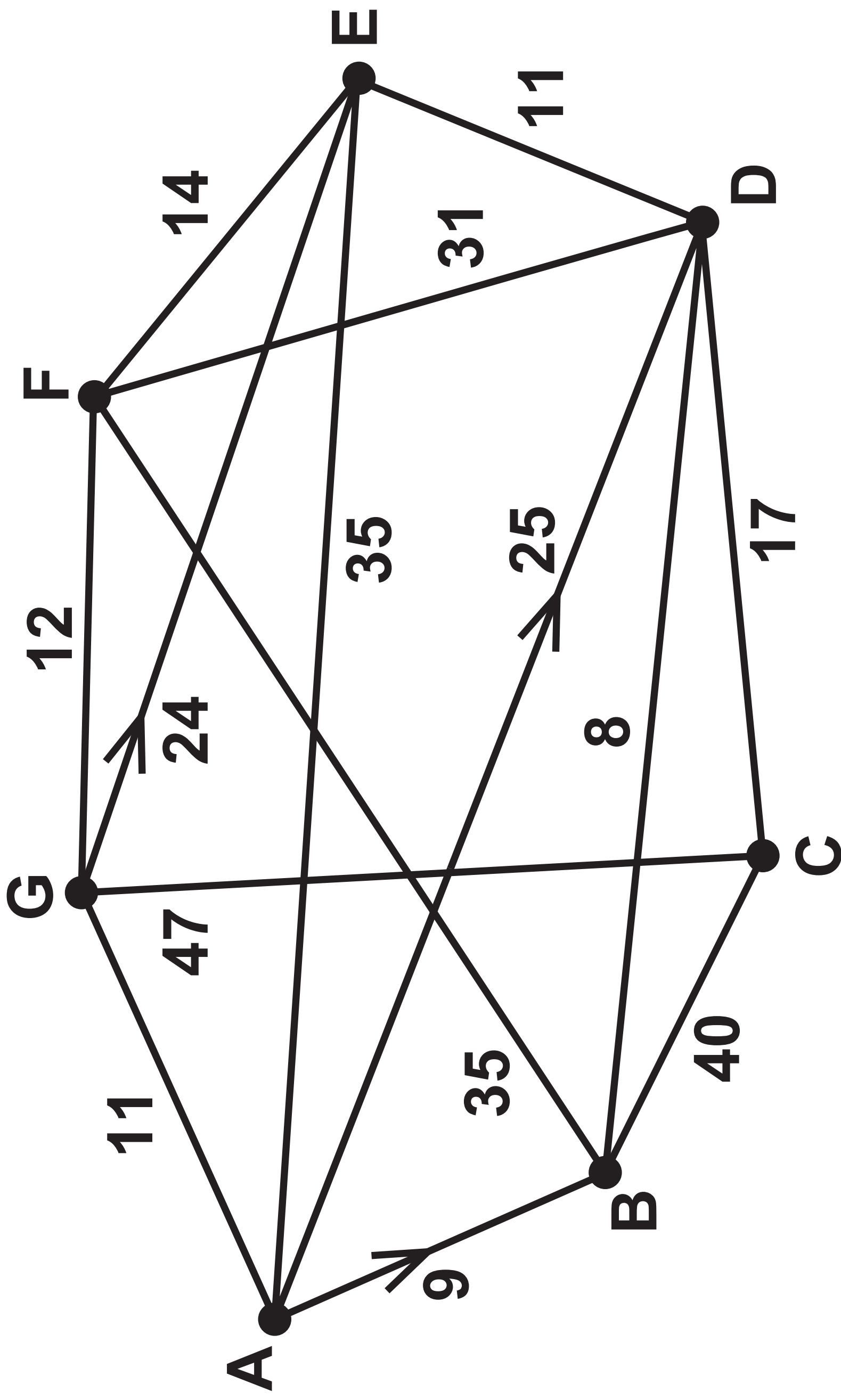


Diagram 3 – spare copy

	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]

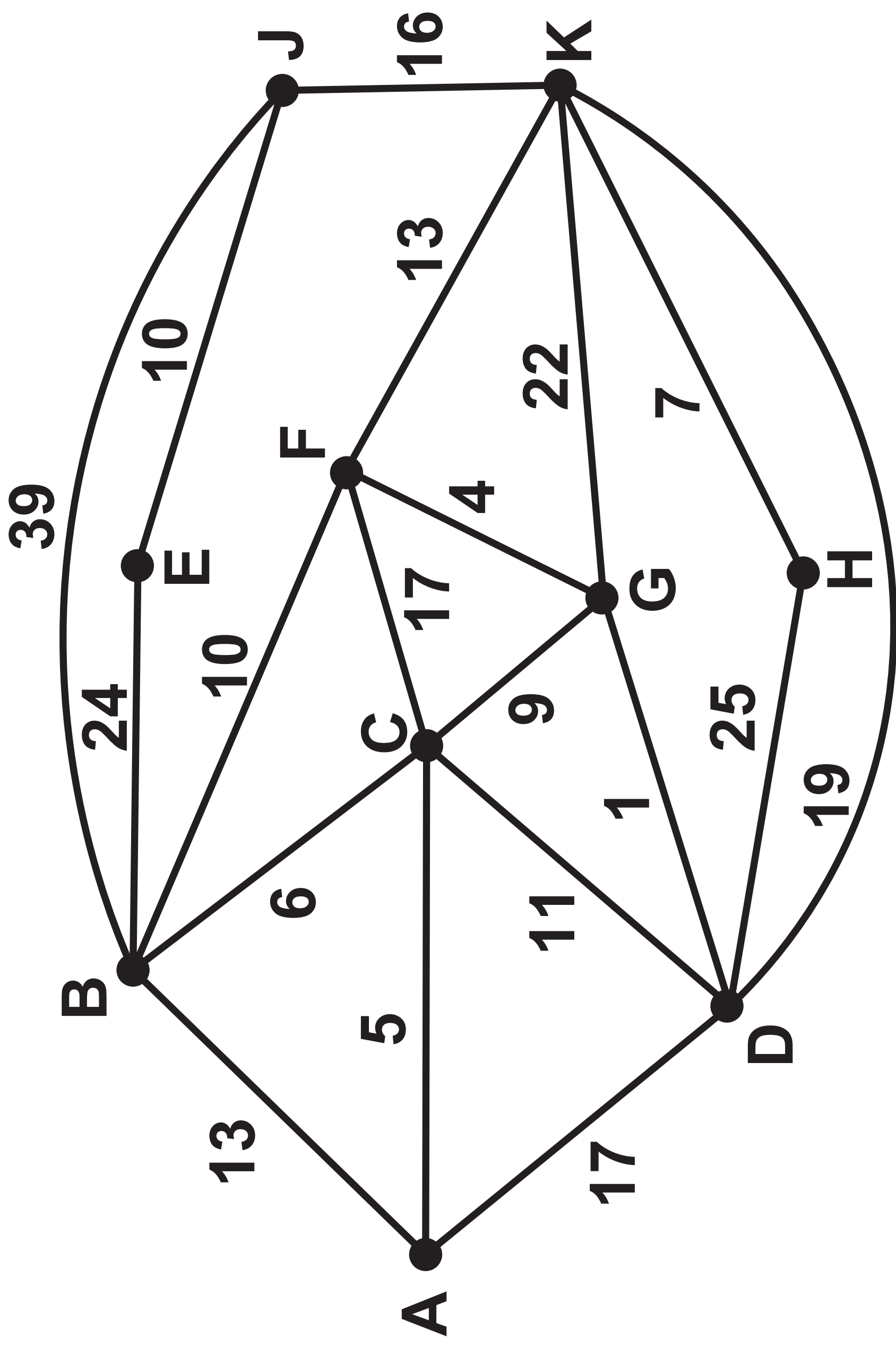


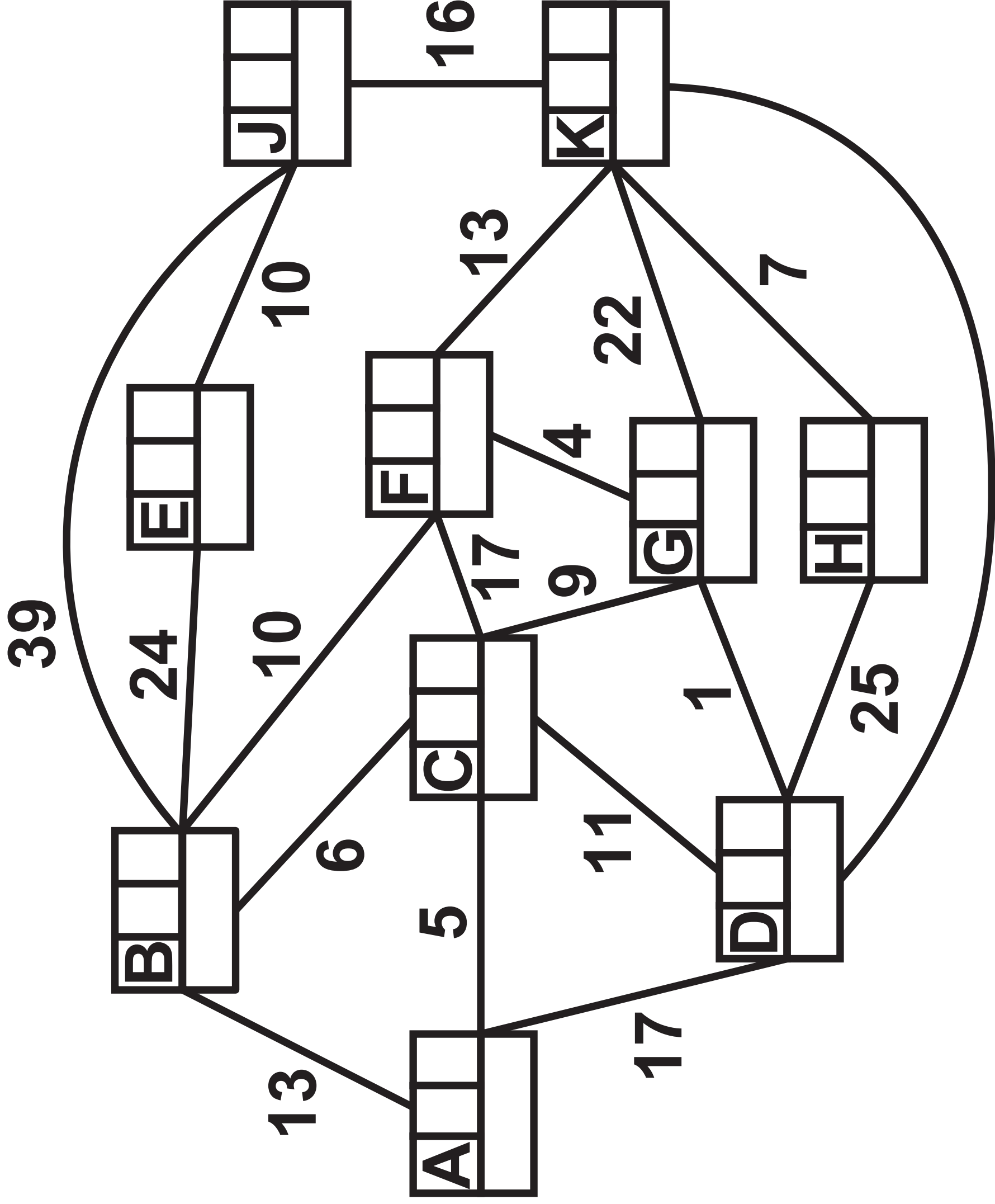
Diagram 6 – spare copy

KEY:

Vertex	Order of labelling	Final value
Working value		

(continued on the next page)

Diagram 6 – spare copy continued.



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Diagram 6 – spare copy continued.

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

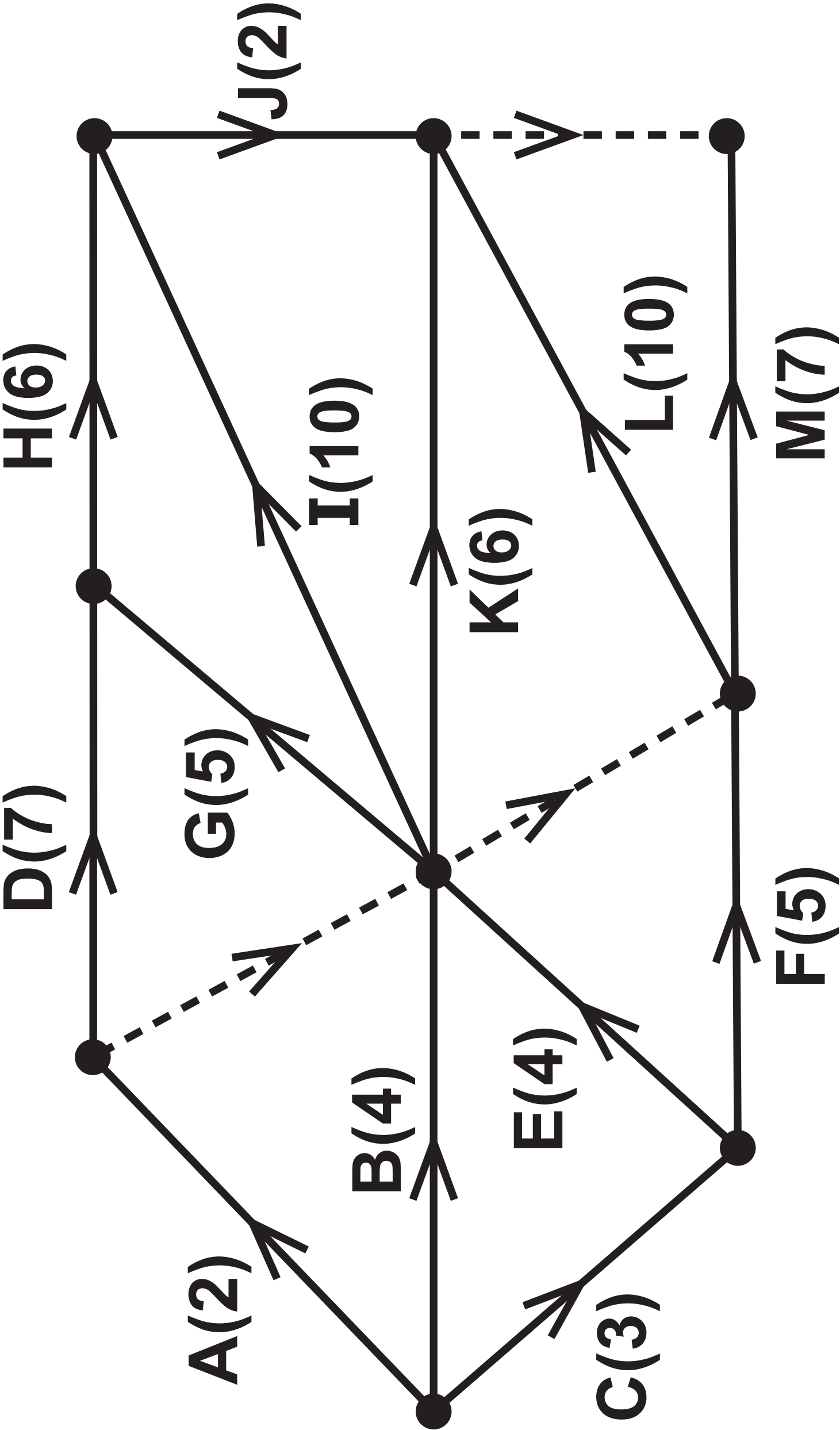


Diagram 9 – spare copy

KEY:

Early event time
Late event time

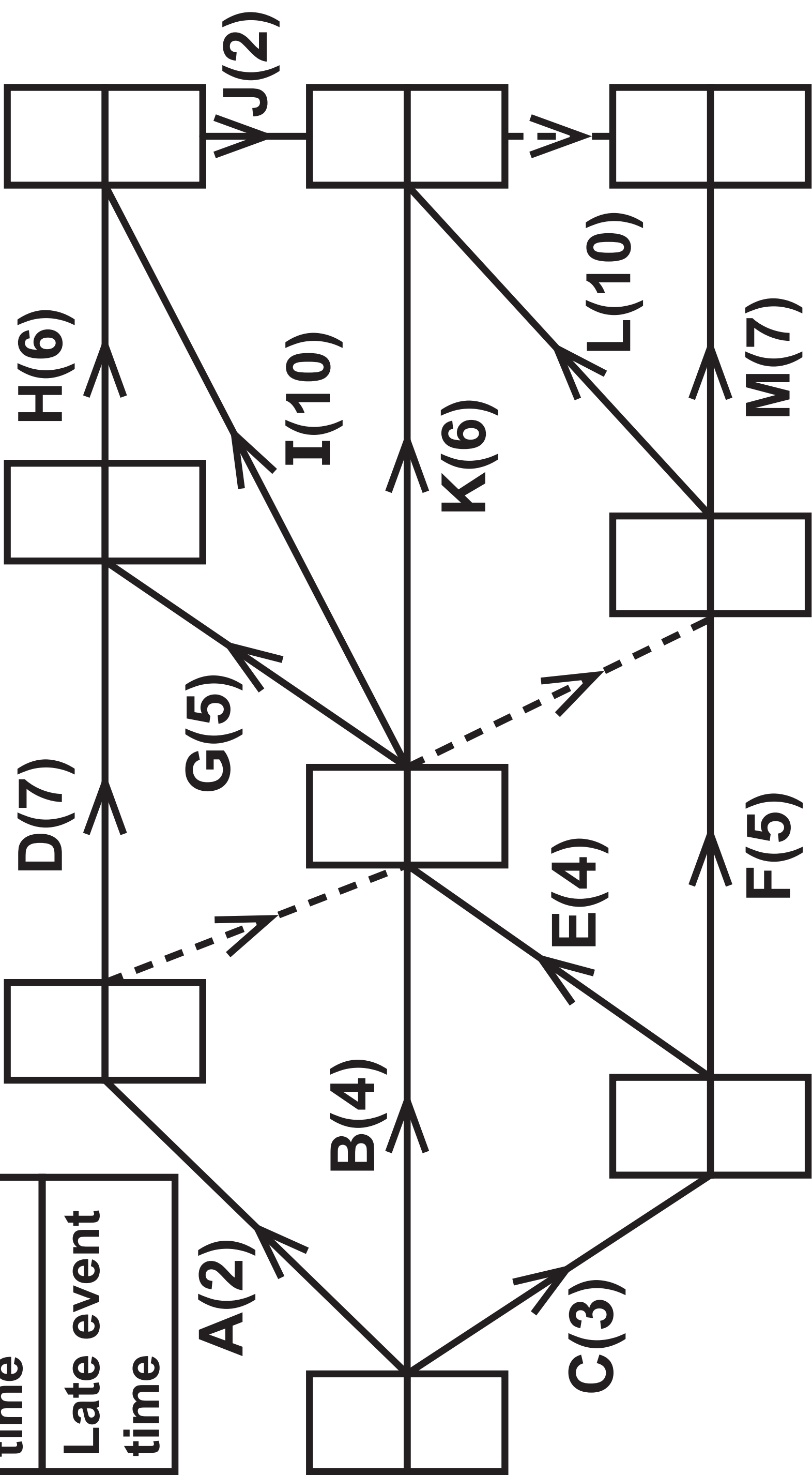


Diagram 10 – spare copy

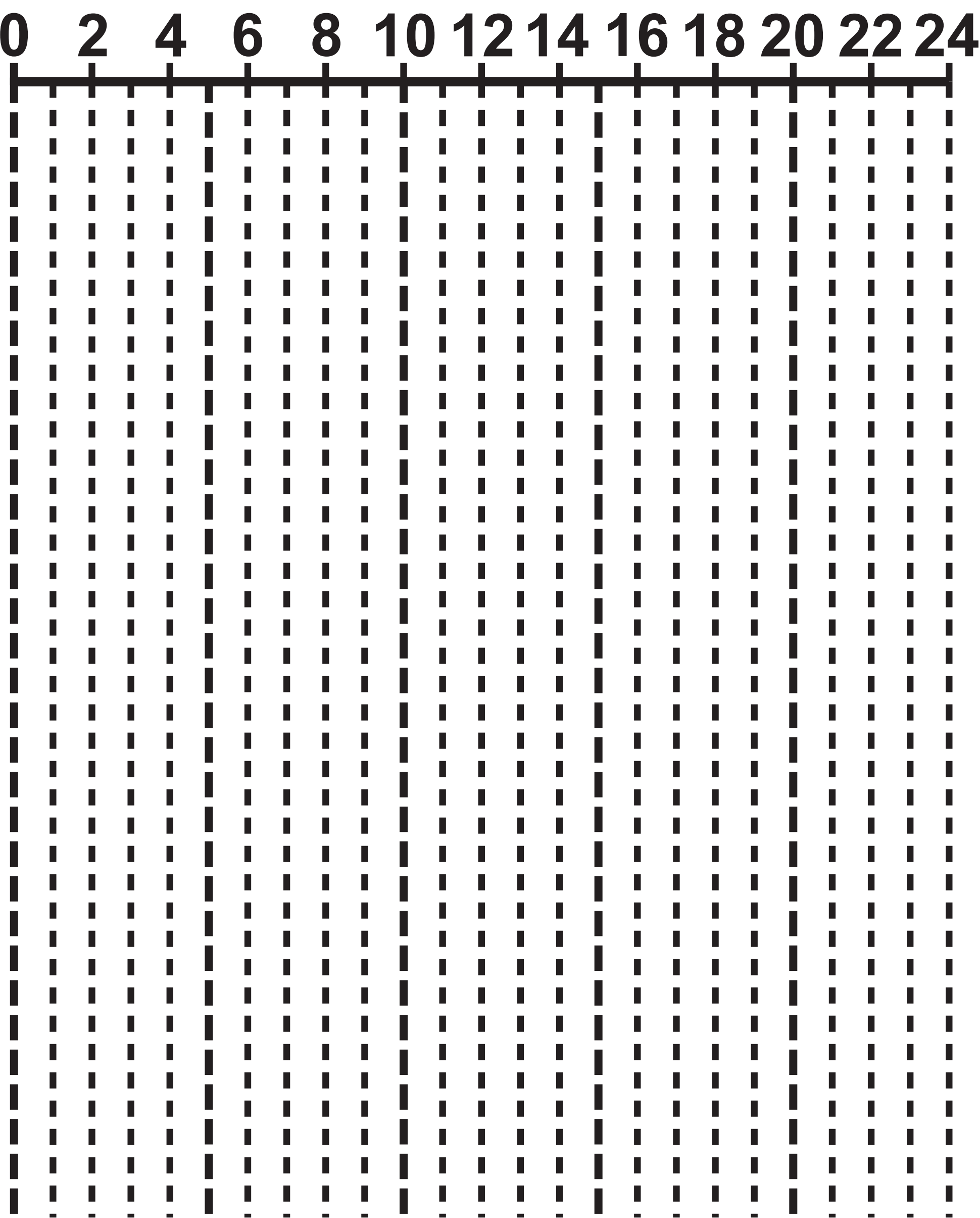


Diagram 11 – spare copy

Number of workers

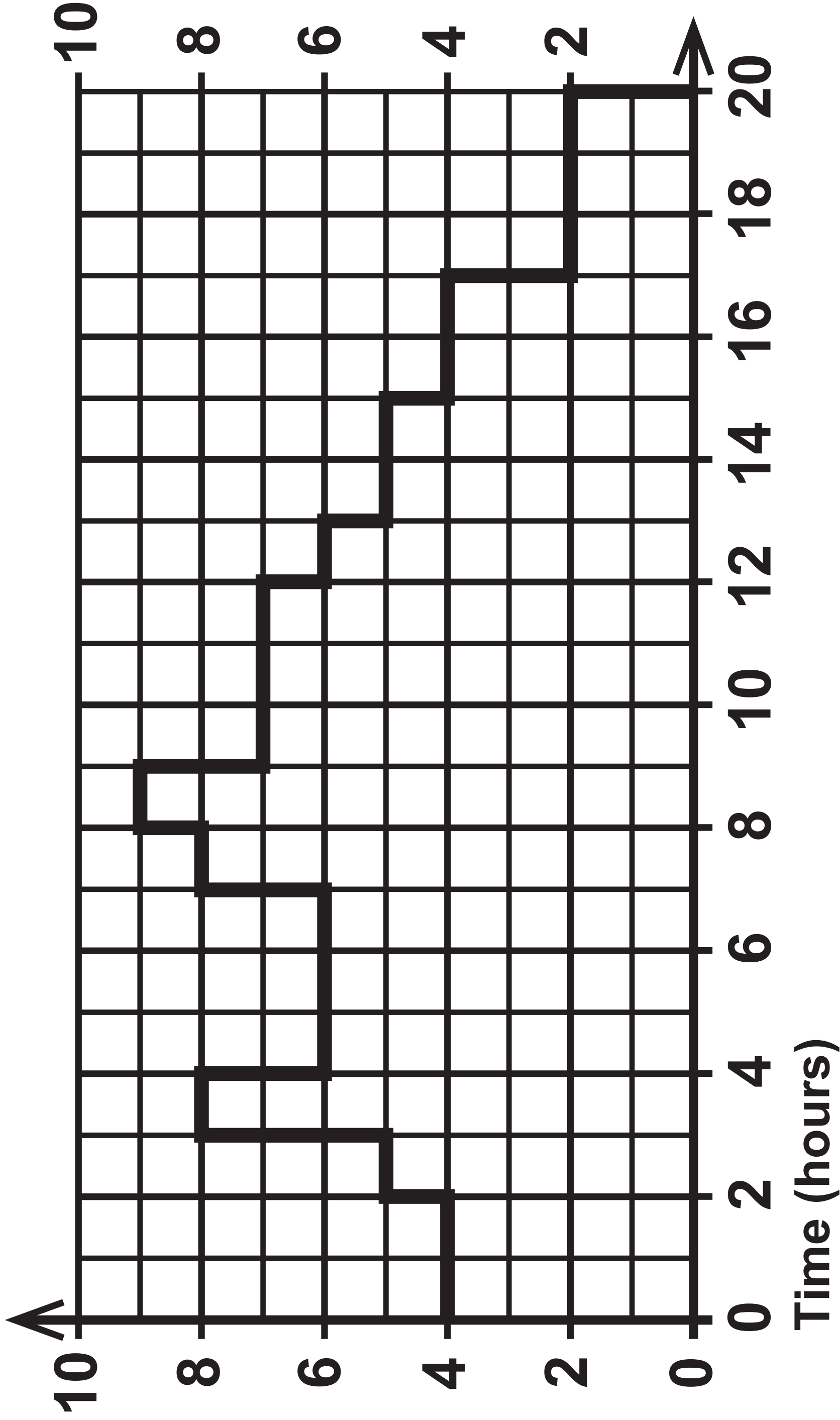


Diagram 12 – spare copy

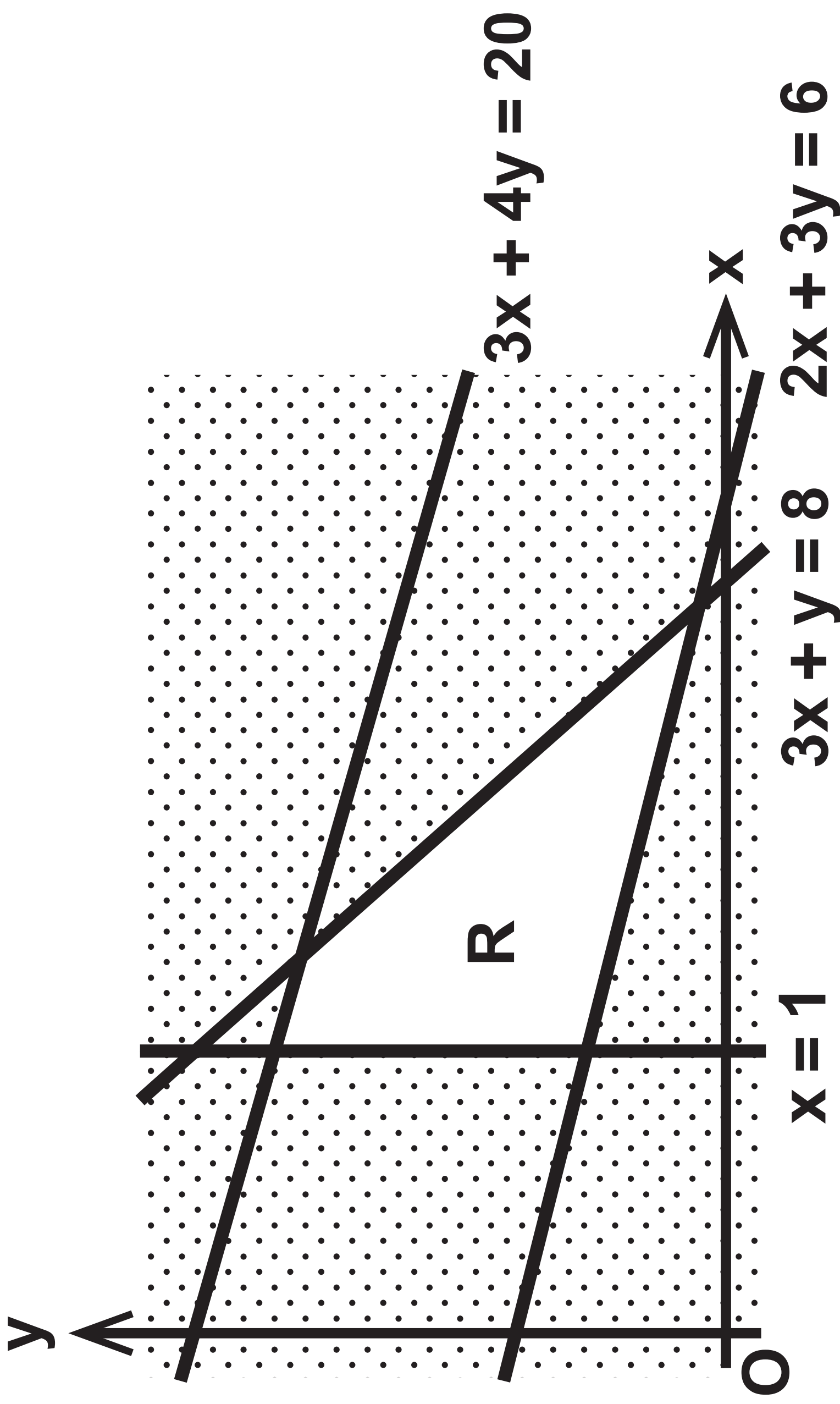


Diagram 13 – spare copy

b.v.	x	y	s ₁	s ₂	s ₃
s ₁	0	0	1	0	$\frac{9}{7}$
x	1	0	0	0	$\frac{1}{7}$
y	0	1	0	0	$-\frac{3}{7}$
s ₂	0	0	0	1	$\frac{1}{7}$
P	0	0	0	0	$\frac{11}{7} - \frac{3}{7}k$

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Diagram 13 – spare copy continued.

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