

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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Spare copies

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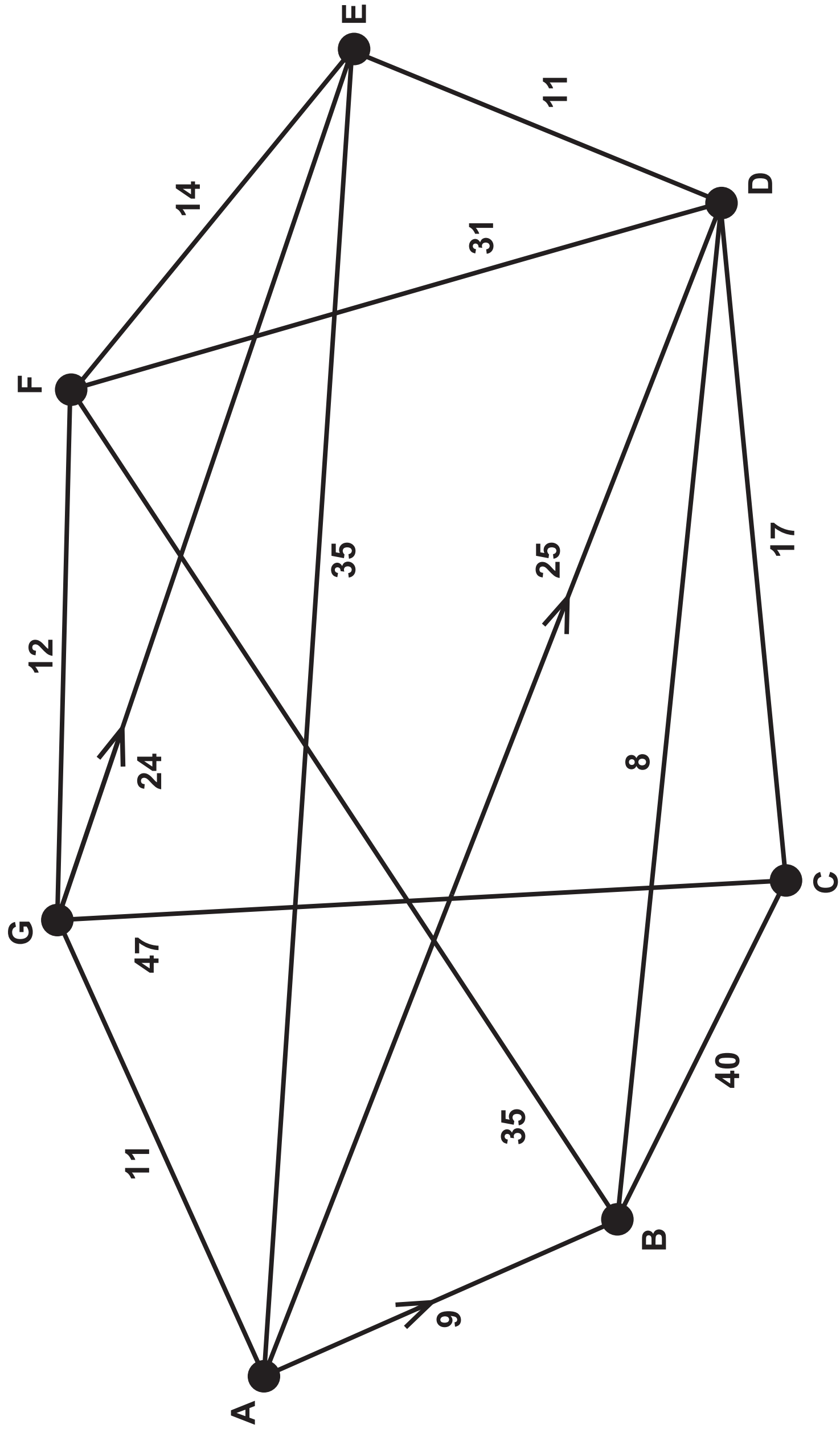


Diagram 3

	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	–

[The total weight of the network is 268]

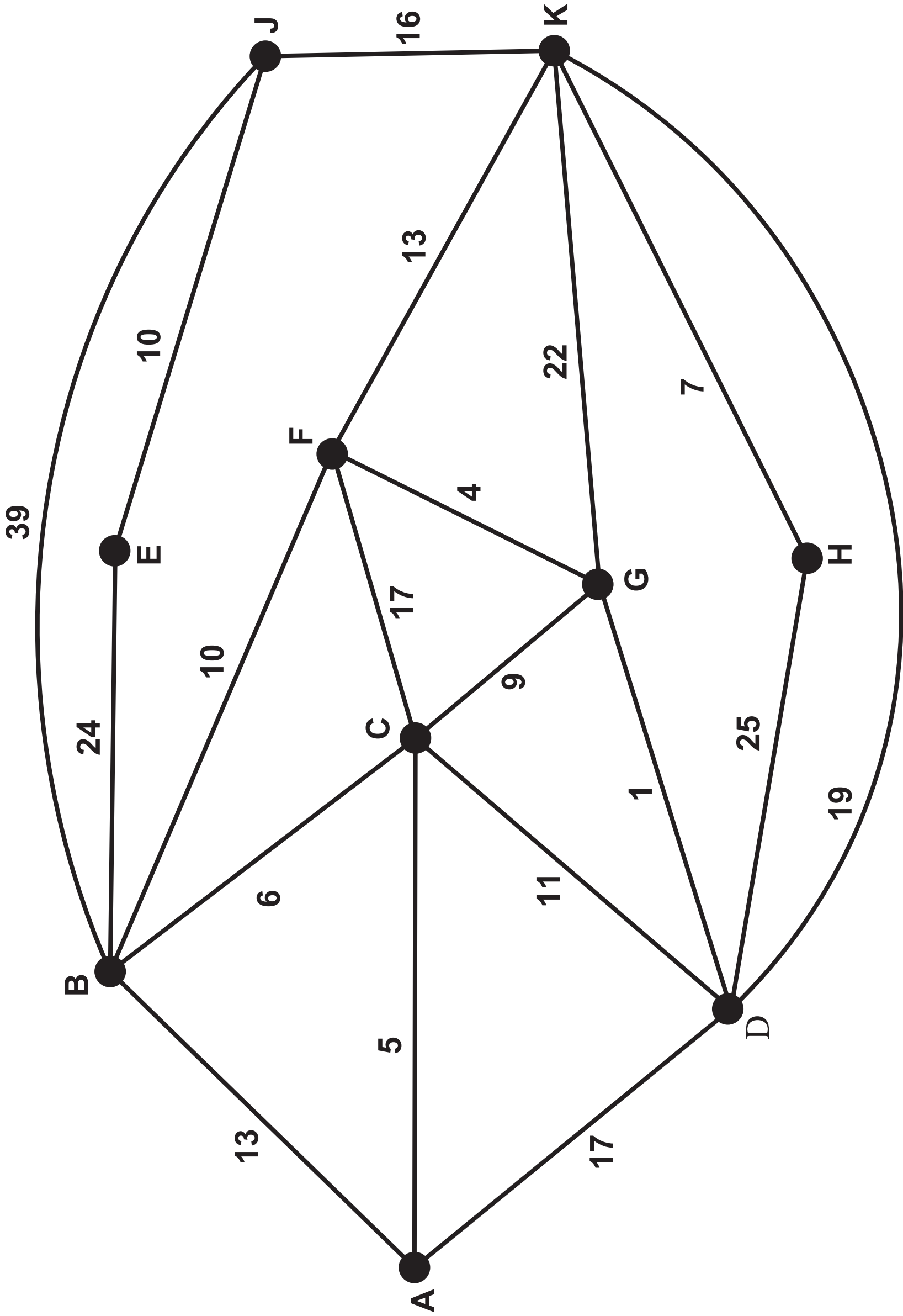
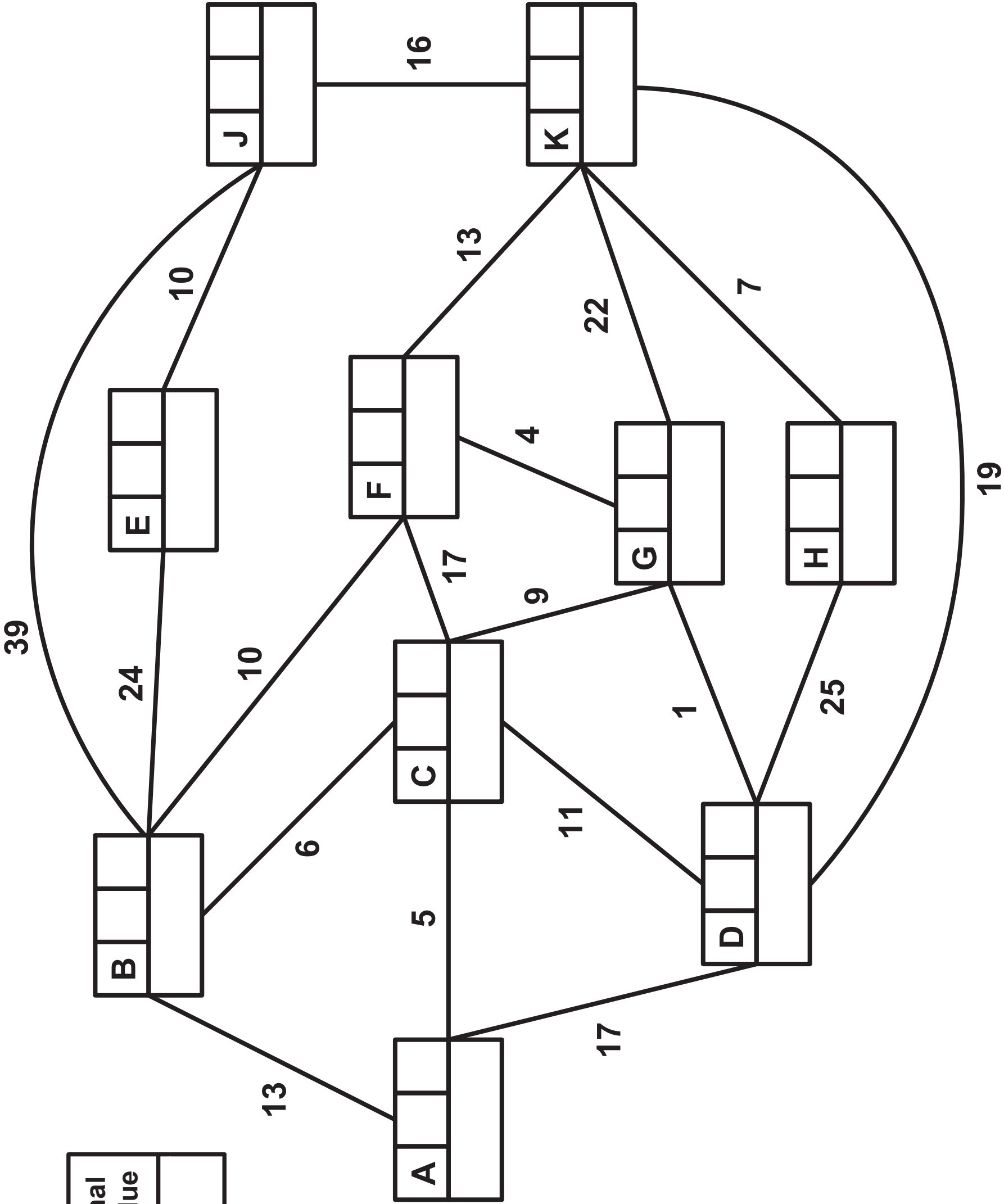


Diagram 6

KEY:

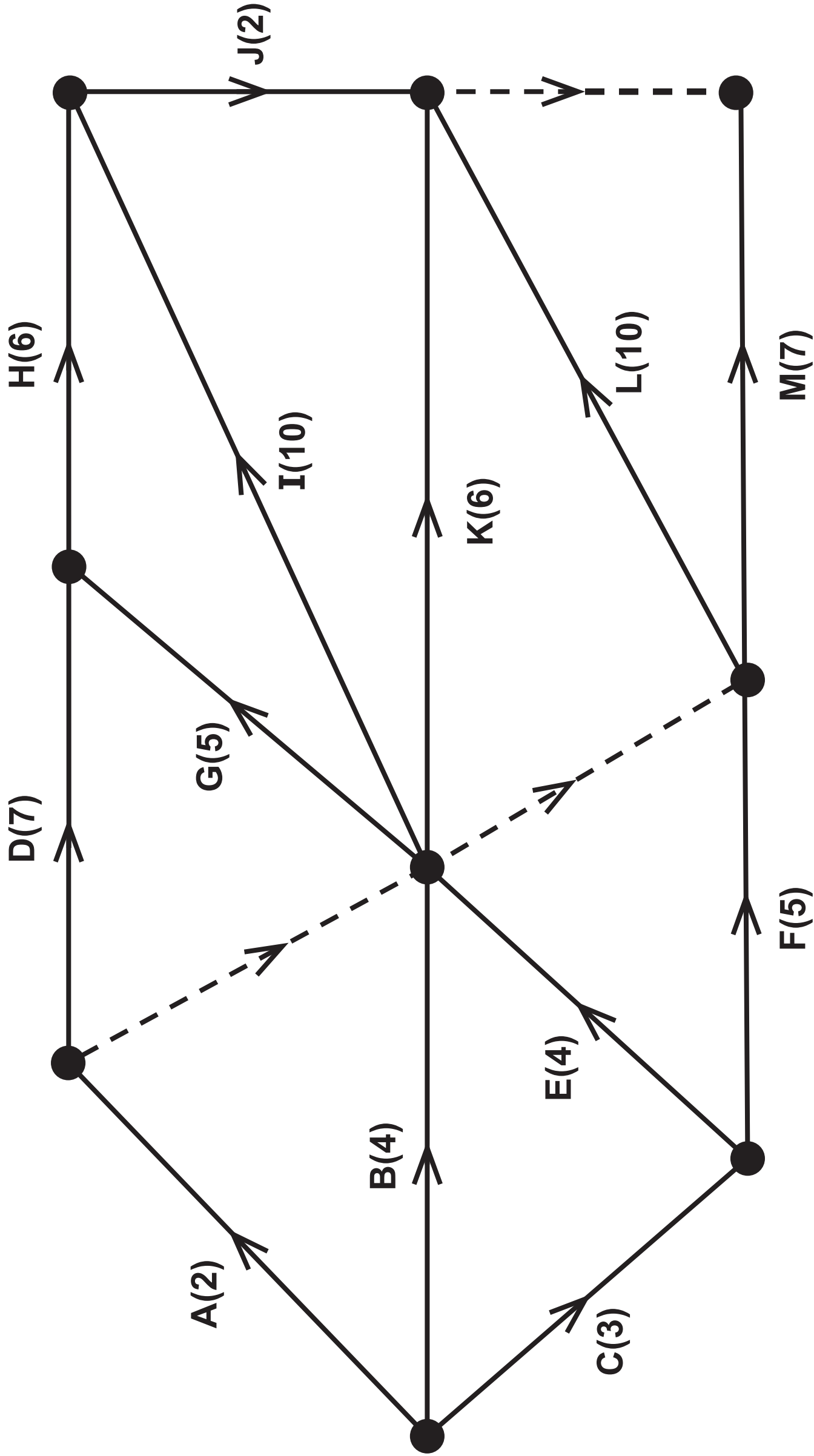
Vertex	Order of labelling	Final value
Working value		



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	$\frac{1}{4}$	$\frac{267}{8}$



KEY:

Early event time	Late event time
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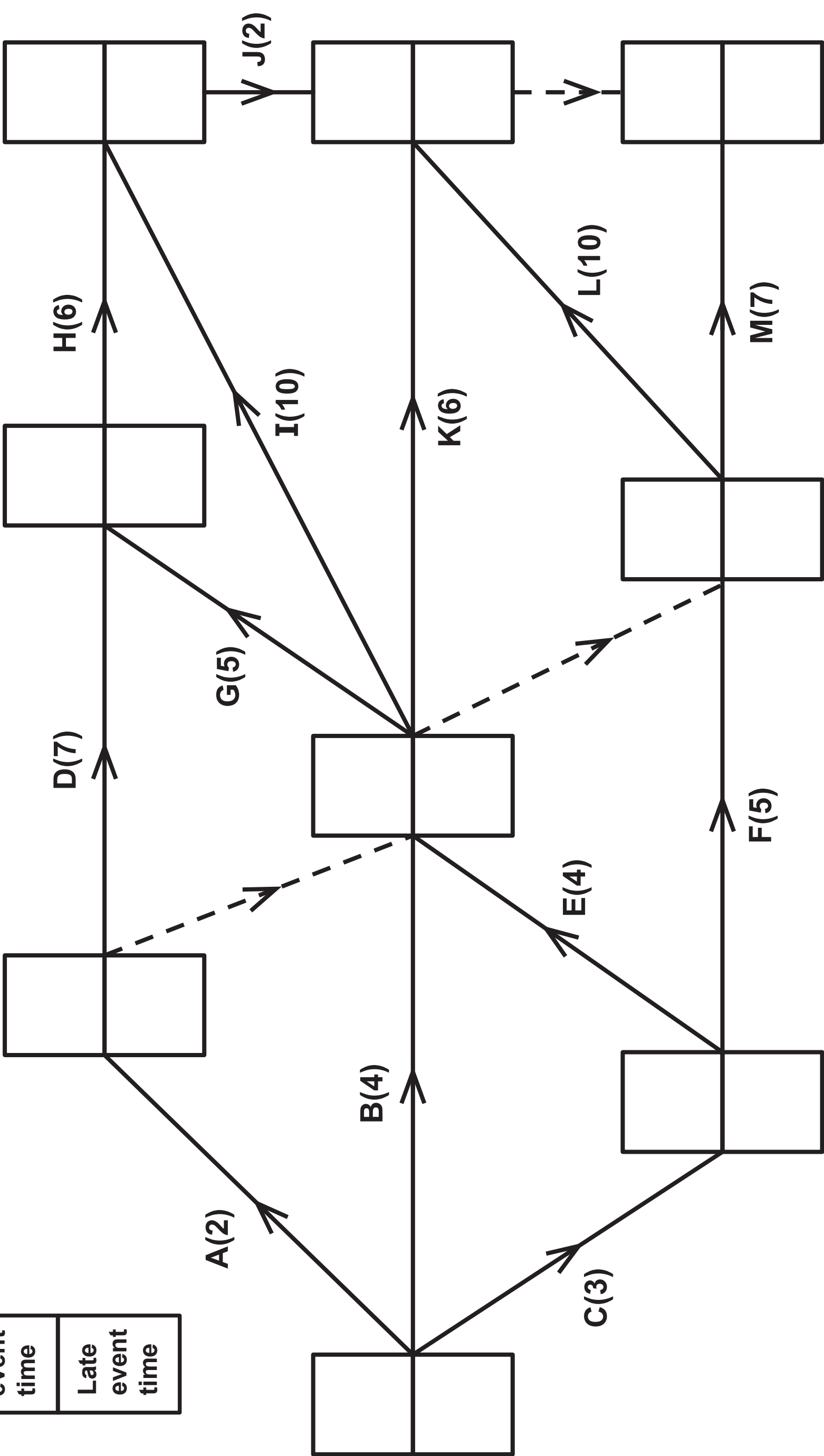


Diagram 10

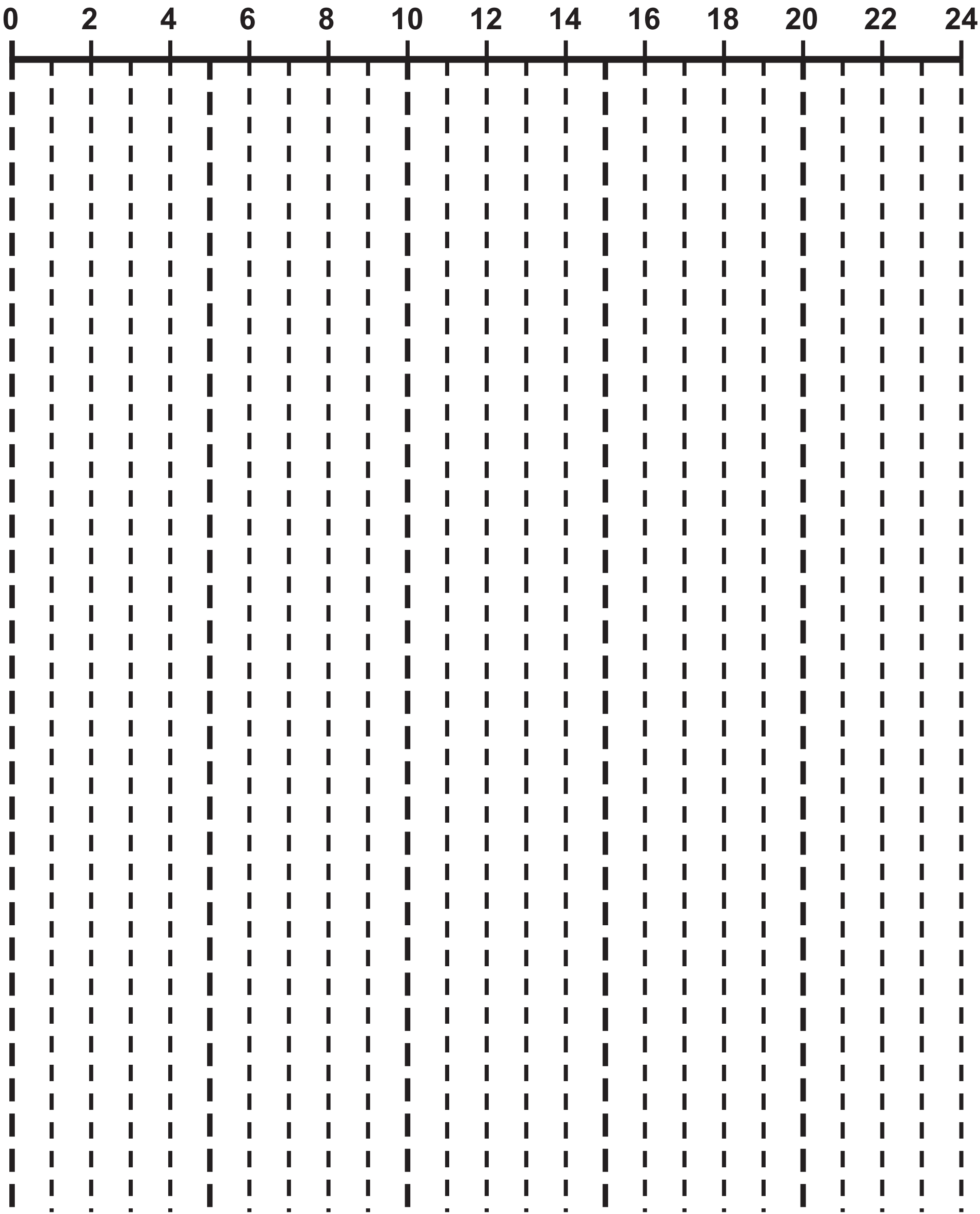
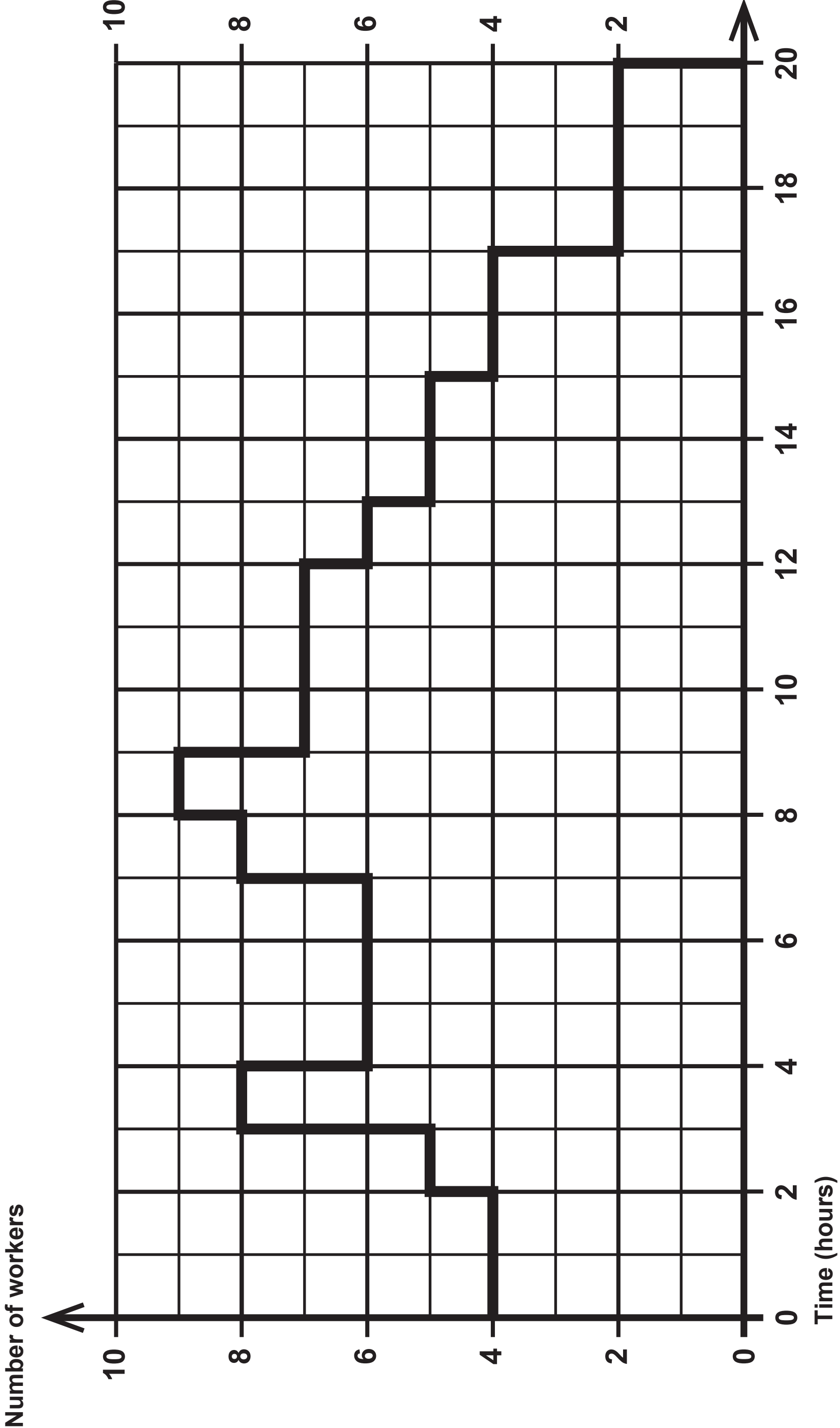
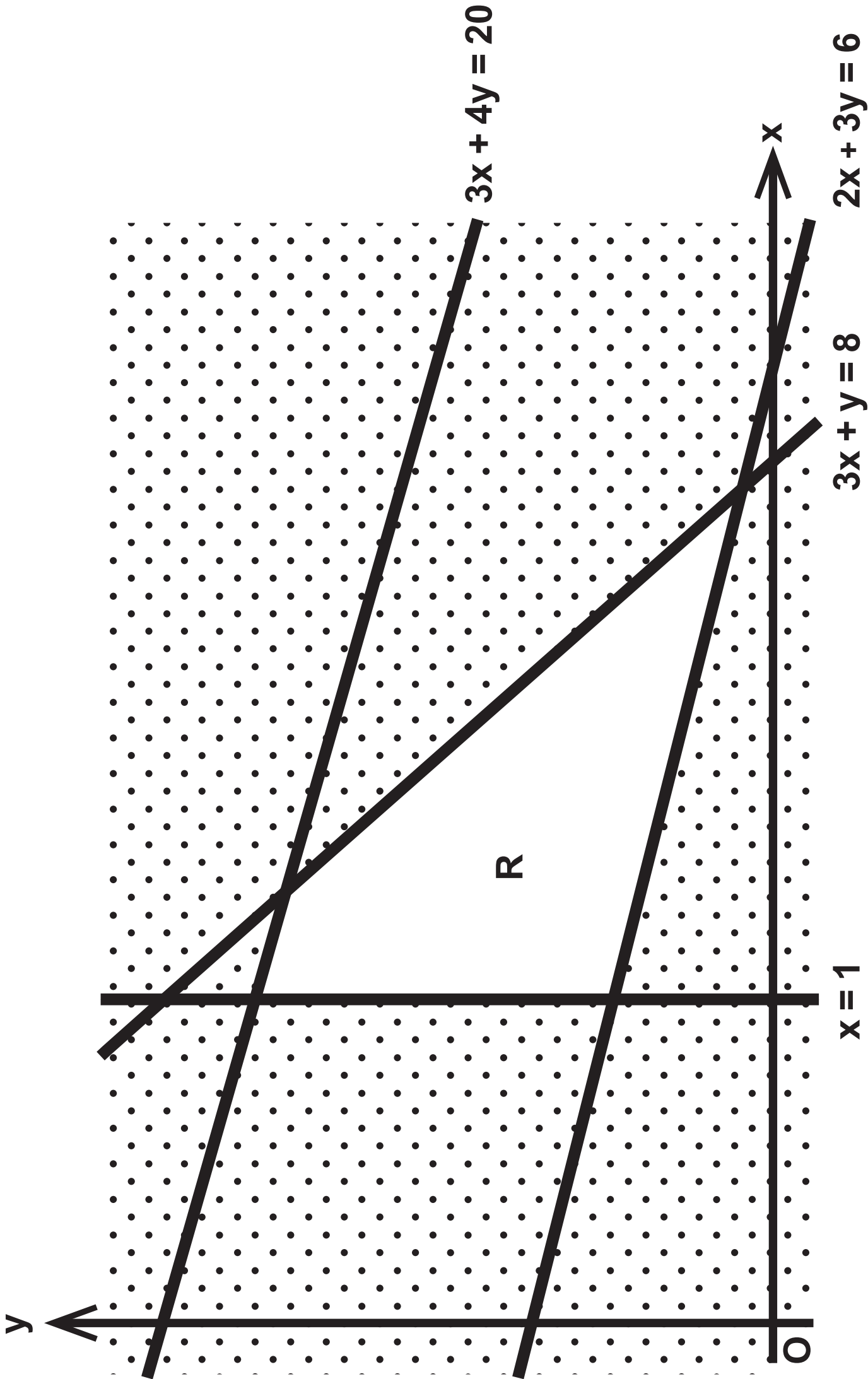


Diagram 11





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	$M - \frac{11}{7} + \frac{3}{7}k$	$\frac{198}{7} + \frac{2}{7}k$

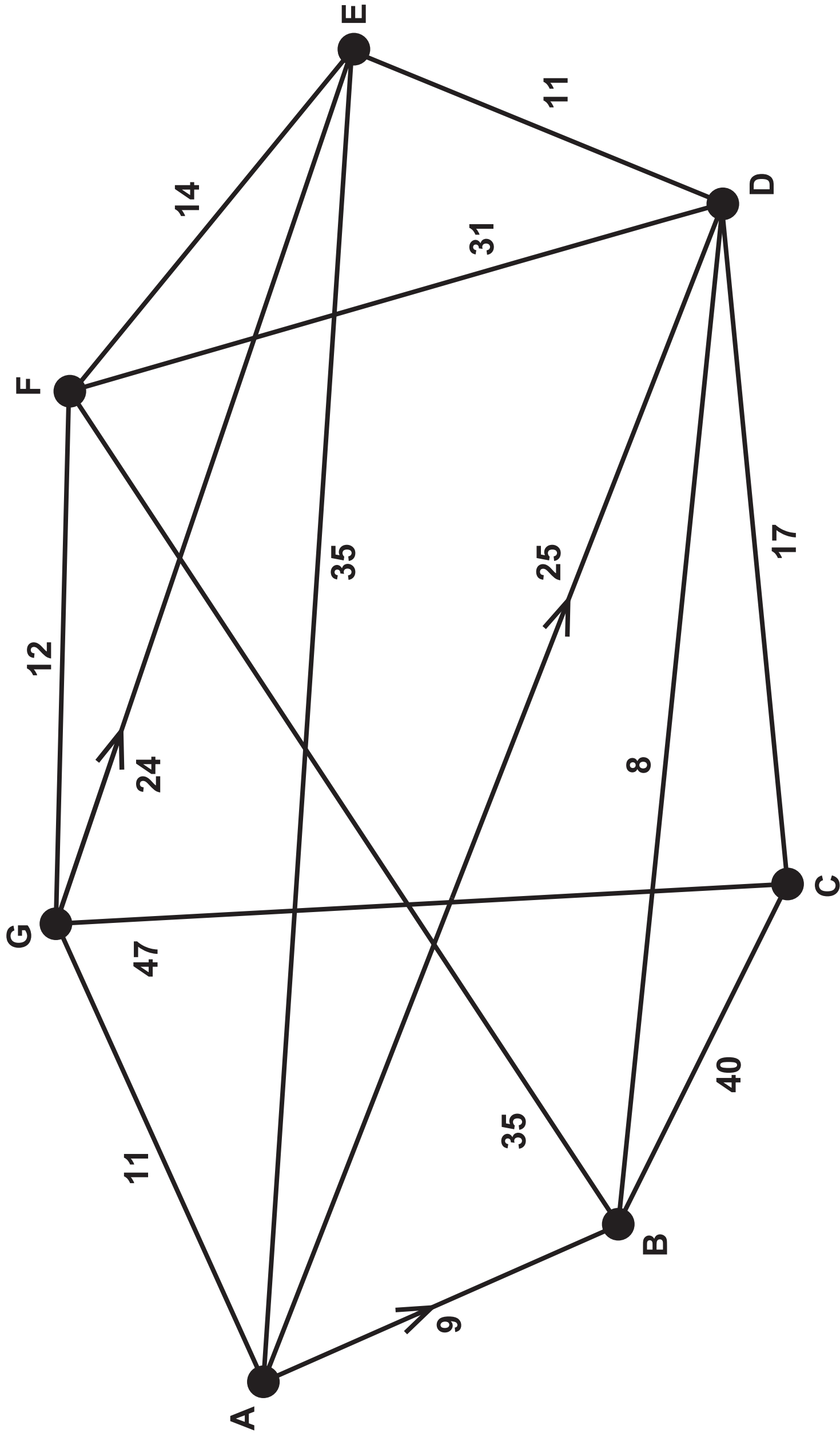


Diagram 3 – spare copy

	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	–

[The total weight of the network is 268]

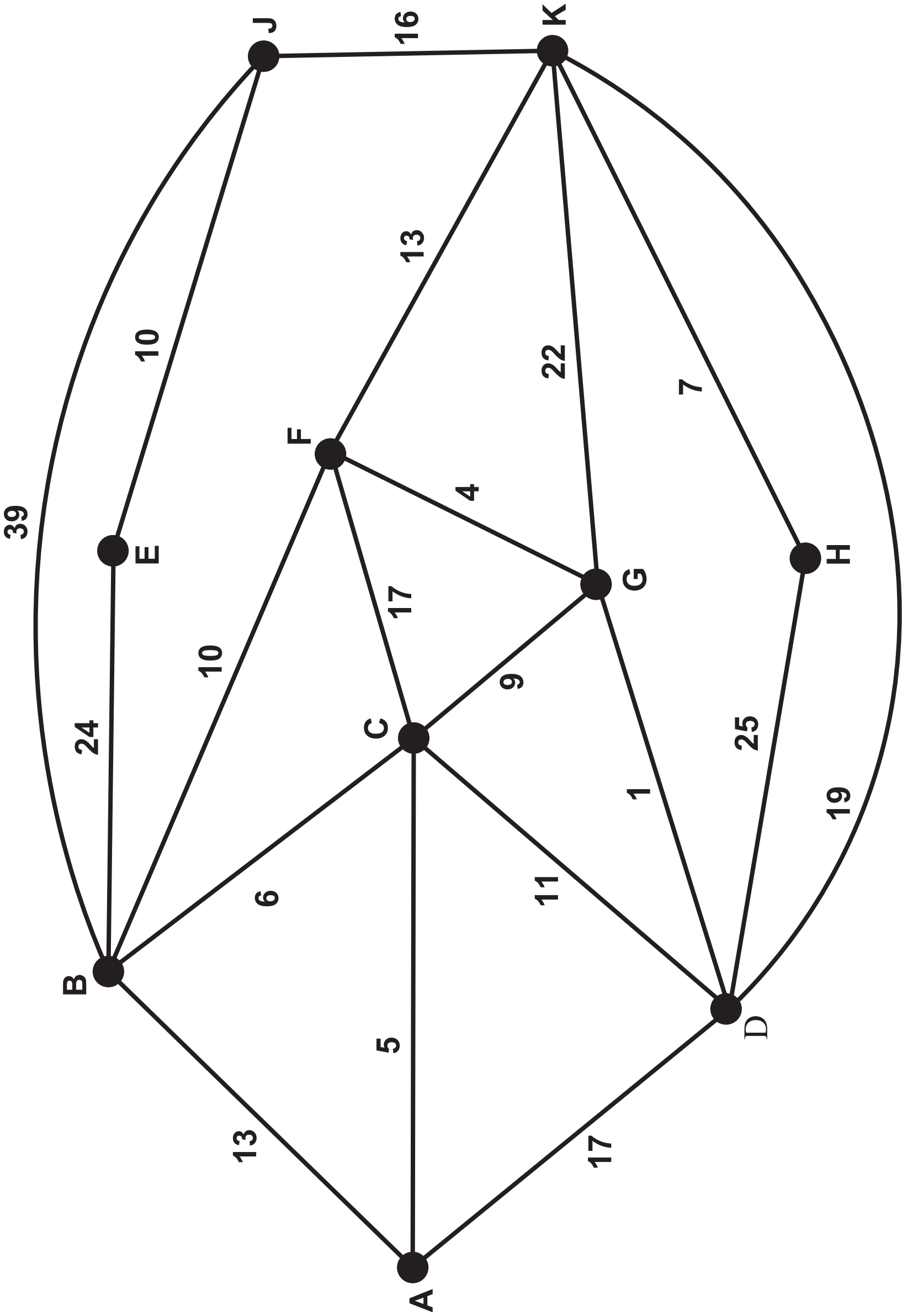
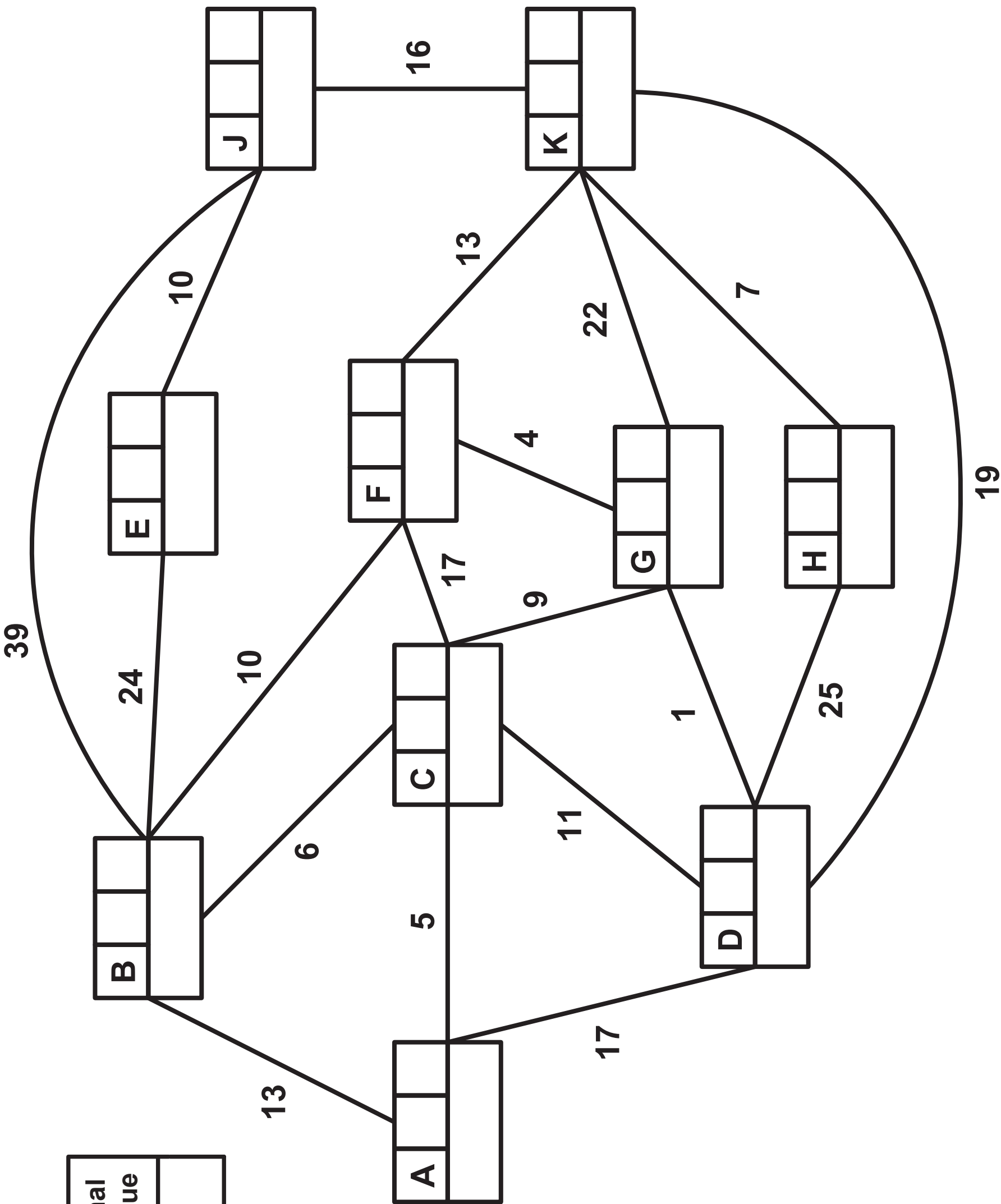


Diagram 6 – spare copy

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: _____

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

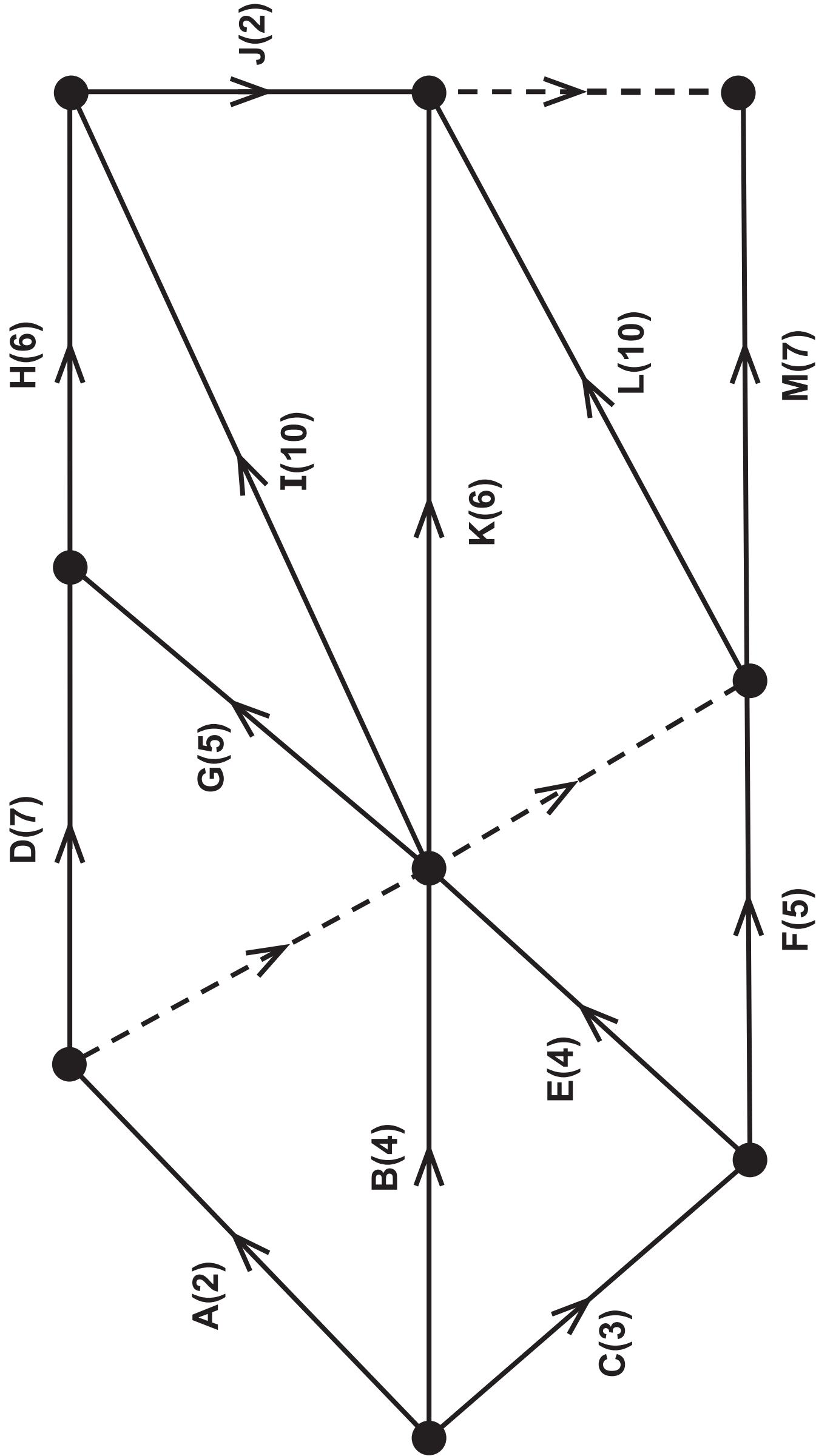


Diagram 9 – spare copy

KEY:

Early event time	Late event time
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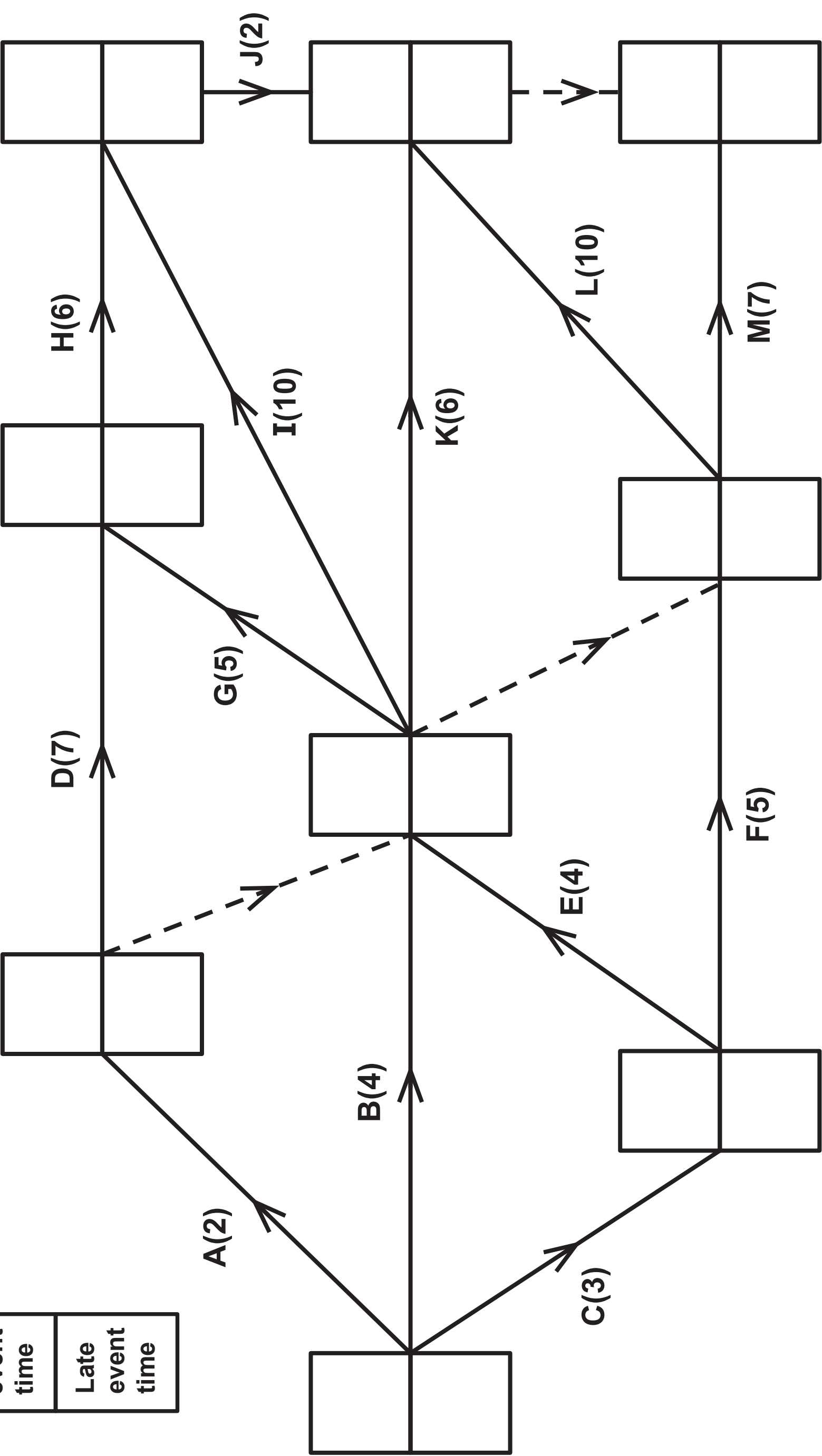


Diagram 10 – spare copy

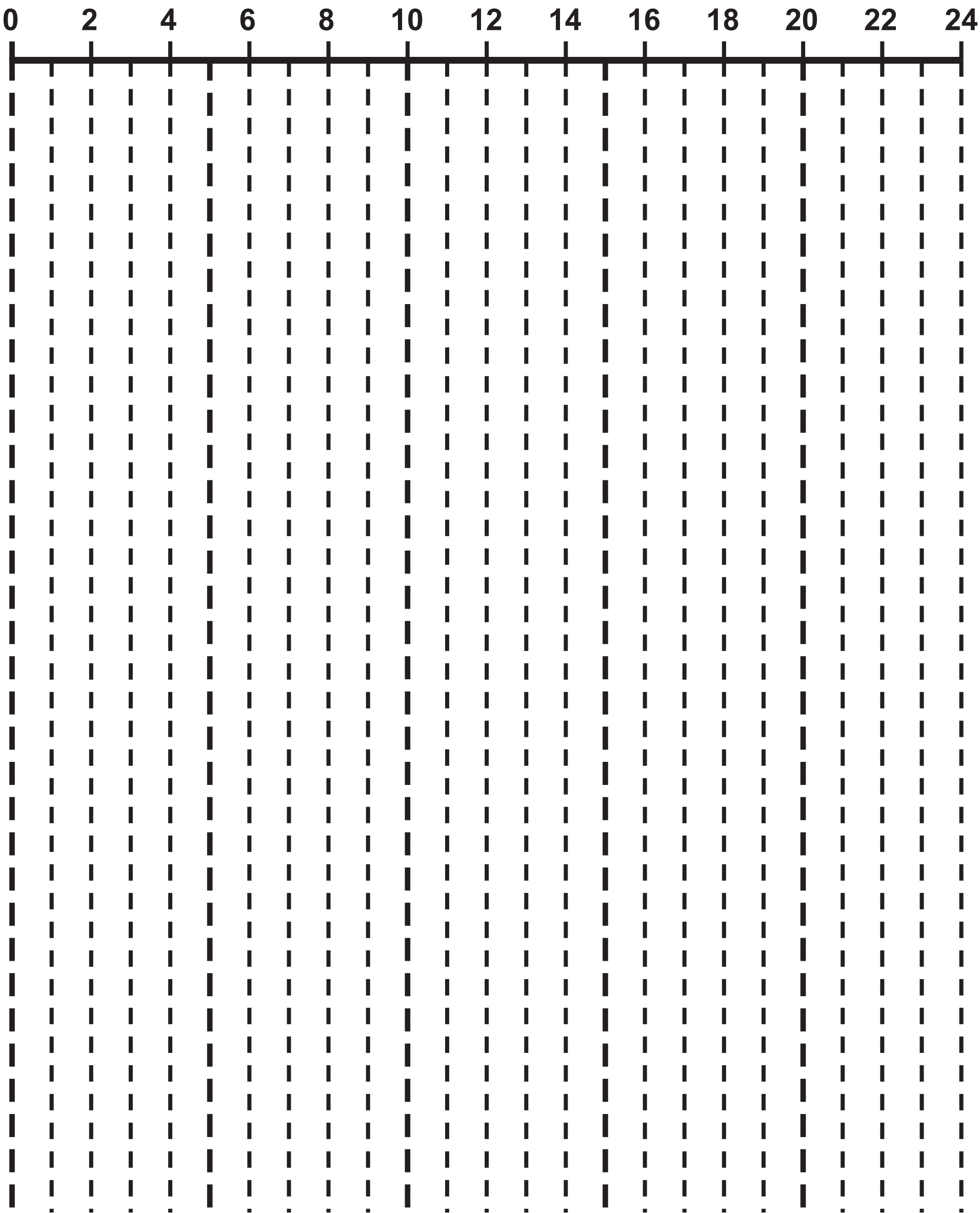


Diagram 11 – spare copy

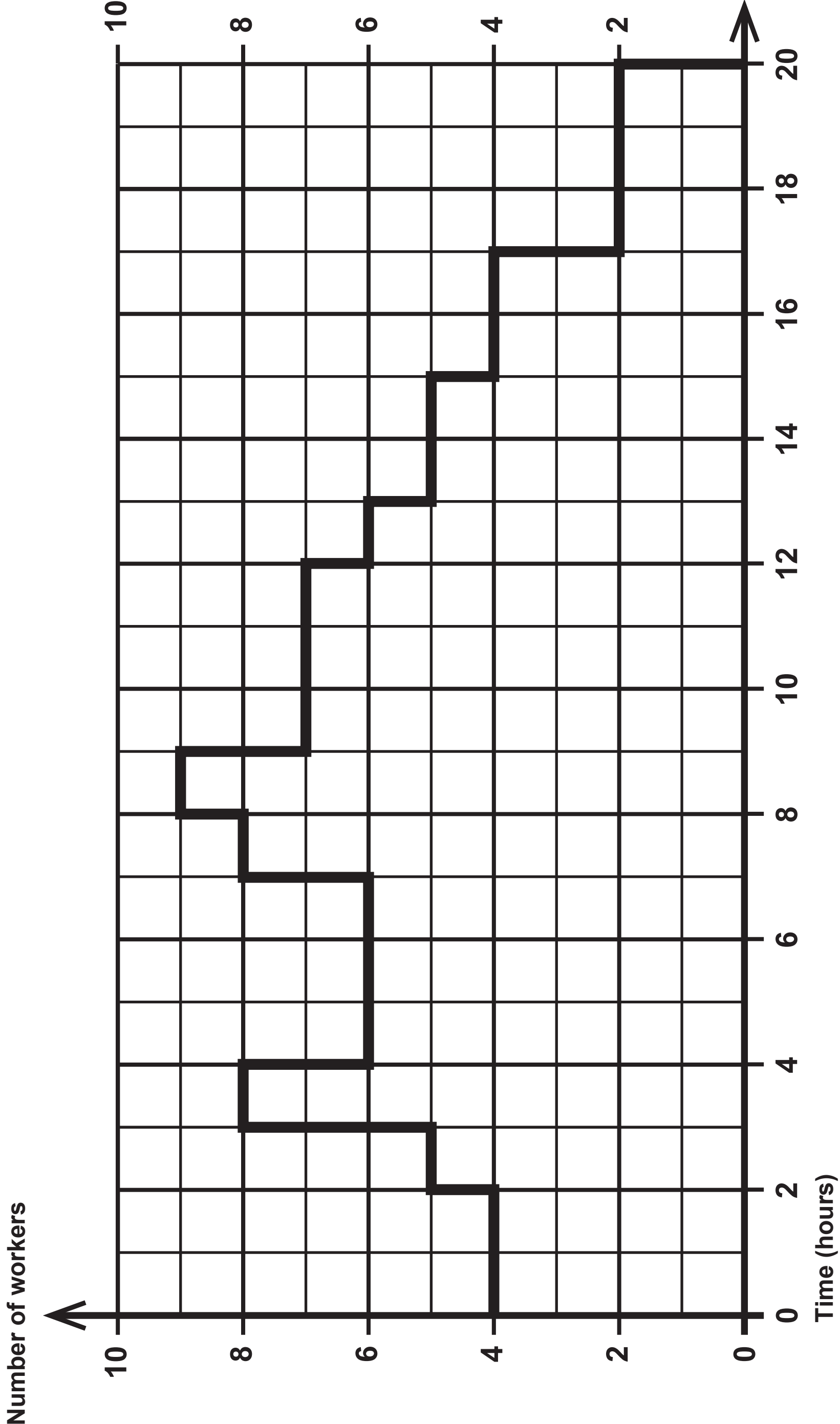


Diagram 12 – spare copy

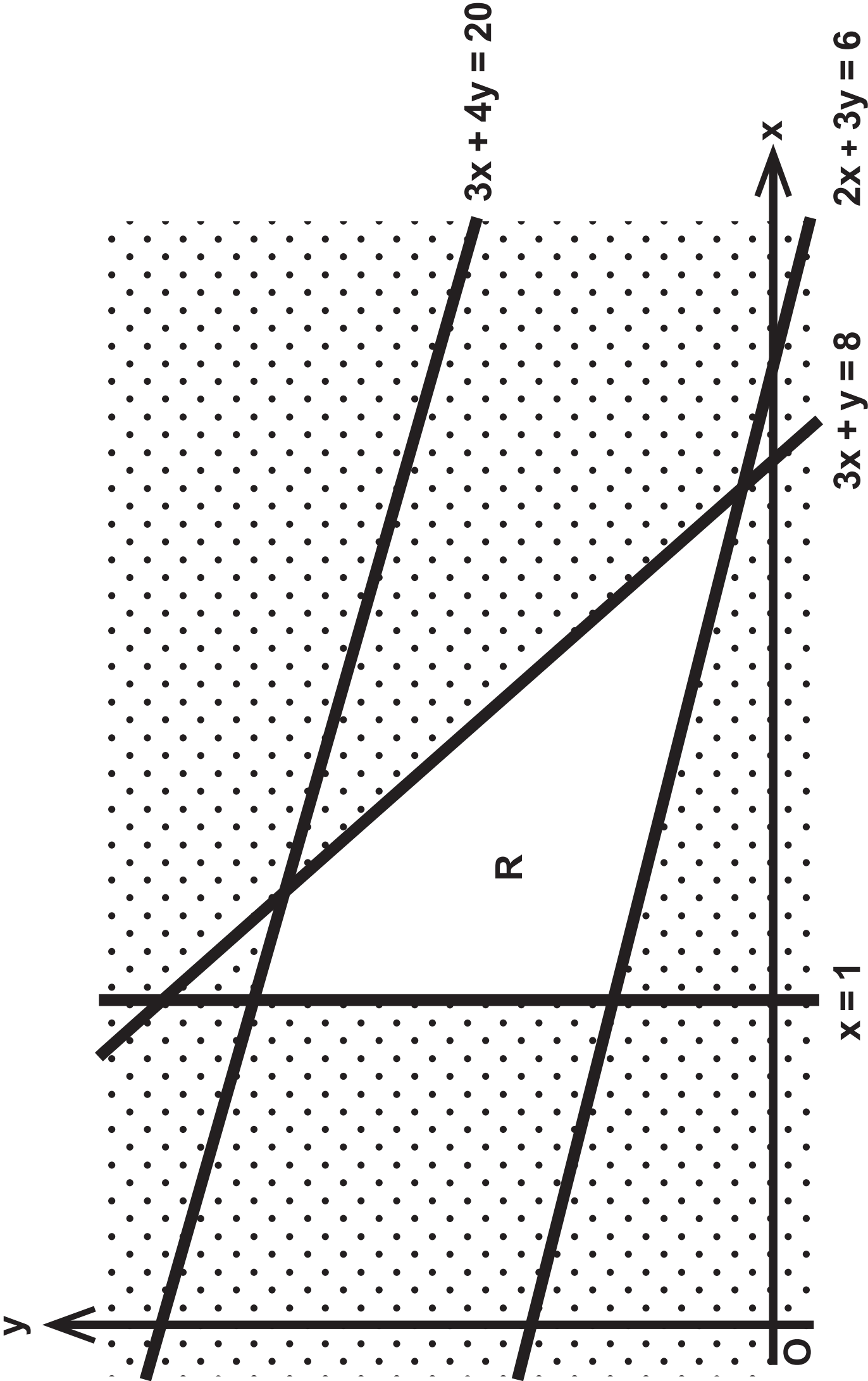


Diagram 13 – spare copy

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	$\frac{11}{7} - \frac{3k}{7}$	$\frac{33}{7} - \frac{2k}{7}$	M	$M - \frac{11}{7} + \frac{3k}{7}$	$\frac{198}{7} + \frac{2k}{7}$