

Write your name here

|         |             |
|---------|-------------|
| Surname | Other names |
|---------|-------------|

**Pearson Edexcel**  
**Level 3 GCE**

Centre Number

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

Candidate Number

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

# Further Mathematics

**Advanced**

**Further Mathematics Option 1**

**Paper 3: Decision Mathematics 1**

**Further Mathematics Option 2**

**Paper 4: Decision Mathematics 1**

Sample Assessment Material for first teaching September 2017

Paper Reference

**9FM0/3D**

**9FM0/4D**

## Answer Book

Do not return the question paper with the answer book.

Total Marks

|  |
|--|
|  |
|--|

Turn over ►

S54443A

©2016 Pearson Education Ltd.

1/1/1/1/1/1/



Pearson

1.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



2.

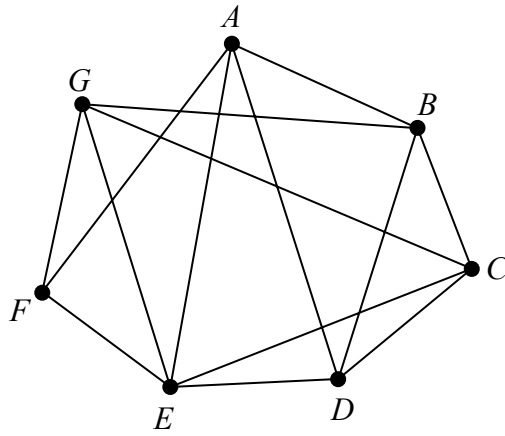


Figure 1

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



3.

|   | A  | B   | C  | D  | E  | F  | G   |
|---|----|-----|----|----|----|----|-----|
| A | –  | 17  | 24 | 16 | 21 | 18 | 41  |
| B | 17 | –   | 35 | 25 | 30 | 31 | $x$ |
| C | 24 | 35  | –  | 28 | 20 | 35 | 32  |
| D | 16 | 25  | 28 | –  | 29 | 19 | 45  |
| E | 21 | 30  | 20 | 29 | –  | 22 | 35  |
| F | 18 | 31  | 35 | 19 | 22 | –  | 37  |
| G | 41 | $x$ | 32 | 45 | 35 | 37 | –   |

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

**Question 3 continued**

|   | A  | B   | C  | D  | E  | F  | G   |
|---|----|-----|----|----|----|----|-----|
| A | –  | 17  | 24 | 16 | 21 | 18 | 41  |
| B | 17 | –   | 35 | 25 | 30 | 31 | $x$ |
| C | 24 | 35  | –  | 28 | 20 | 35 | 32  |
| D | 16 | 25  | 28 | –  | 29 | 19 | 45  |
| E | 21 | 30  | 20 | 29 | –  | 22 | 35  |
| F | 18 | 31  | 35 | 19 | 22 | –  | 37  |
| G | 41 | $x$ | 32 | 45 | 35 | 37 | –   |

**(Total for Question 3 is 11 marks)**

4.

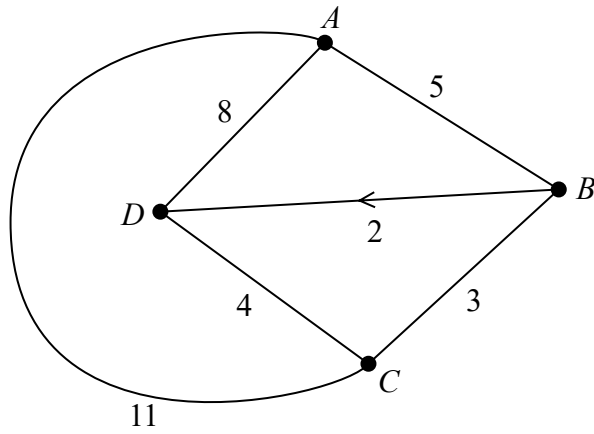


Figure 3

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b)

|   | A  | B        | C  | D |
|---|----|----------|----|---|
| A | –  | 5        | 11 | 8 |
| B | 5  | –        | 3  | 2 |
| C | 11 | 3        | –  | 4 |
| D | 8  | $\infty$ | 4  | – |

|   | A | B | C | D |
|---|---|---|---|---|
| A | A | B | C | D |
| B | A | B | C | D |
| C | A | B | C | D |
| D | A | B | C | D |

|   | A | B | C | D |
|---|---|---|---|---|
| A |   |   |   |   |
| B |   |   |   |   |
| C |   |   |   |   |
| D |   |   |   |   |

|   | A | B | C | D |
|---|---|---|---|---|
| A |   |   |   |   |
| B |   |   |   |   |
| C |   |   |   |   |
| D |   |   |   |   |

|   | A | B | C | D |
|---|---|---|---|---|
| A |   |   |   |   |
| B |   |   |   |   |
| C |   |   |   |   |
| D |   |   |   |   |

|   | A | B | C | D |
|---|---|---|---|---|
| A |   |   |   |   |
| B |   |   |   |   |
| C |   |   |   |   |
| D |   |   |   |   |



**Question 4 continued**

|          | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> |          |          |          |          |
| <b>B</b> |          |          |          |          |
| <b>C</b> |          |          |          |          |
| <b>D</b> |          |          |          |          |

|          | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> |          |          |          |          |
| <b>B</b> |          |          |          |          |
| <b>C</b> |          |          |          |          |
| <b>D</b> |          |          |          |          |

|          | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> |          |          |          |          |
| <b>B</b> |          |          |          |          |
| <b>C</b> |          |          |          |          |
| <b>D</b> |          |          |          |          |

|          | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> |          |          |          |          |
| <b>B</b> |          |          |          |          |
| <b>C</b> |          |          |          |          |
| <b>D</b> |          |          |          |          |

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**(Total for Question 4 is 14 marks)**

5.

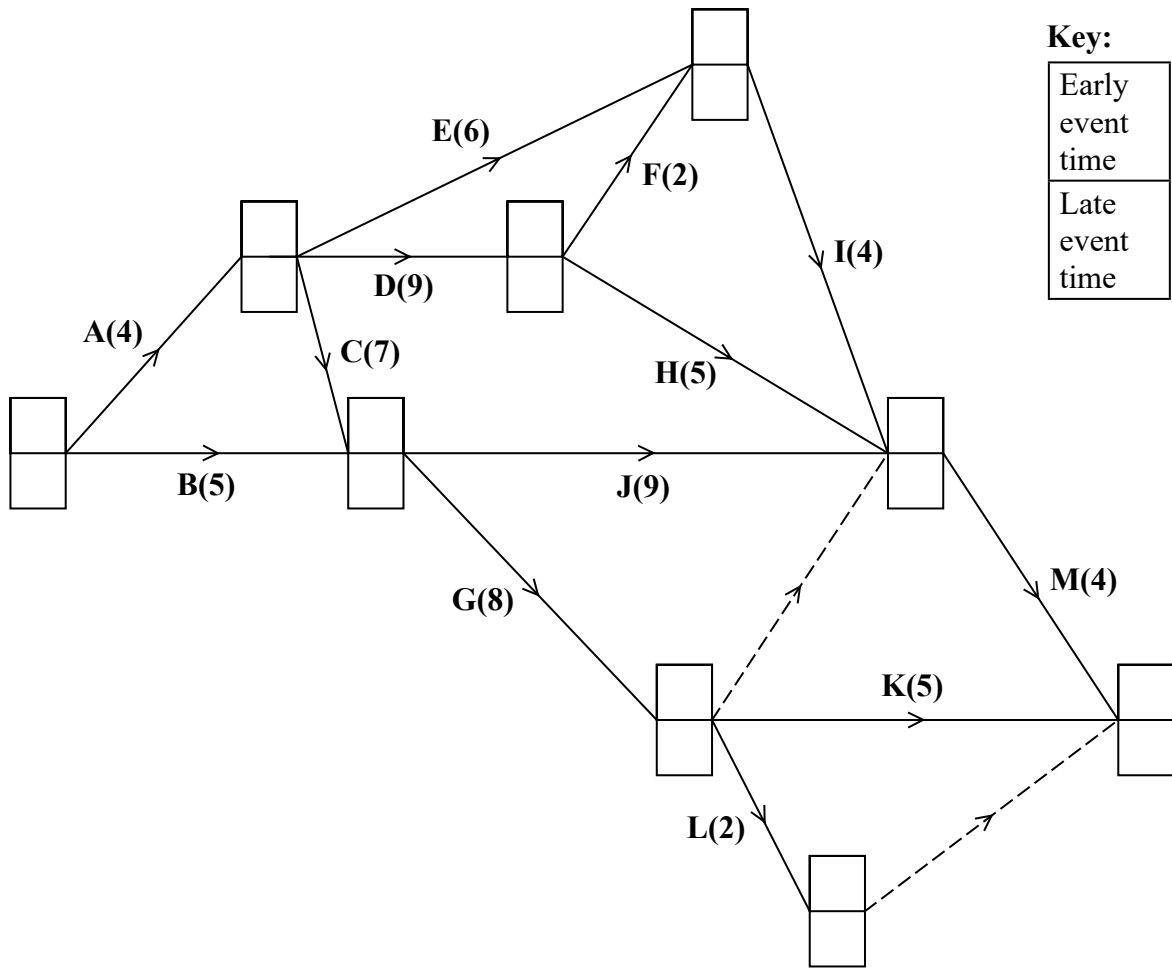
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



6.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

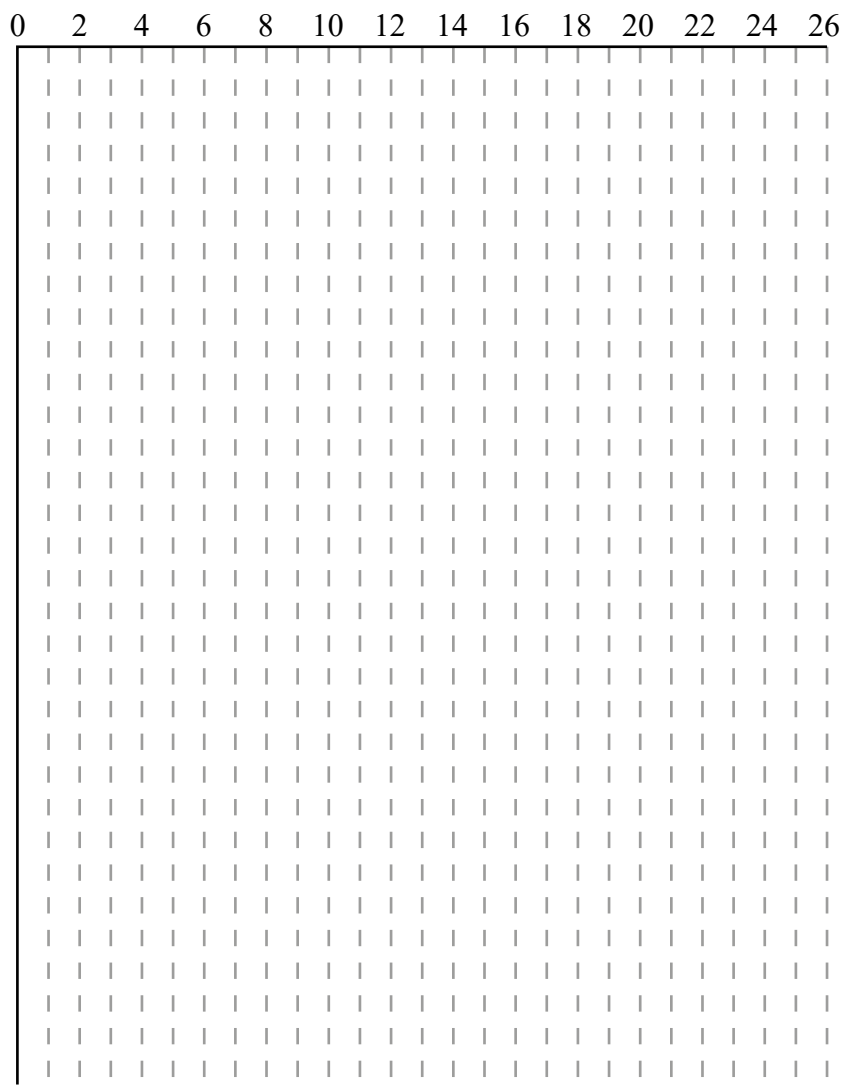
DO NOT WRITE IN THIS AREA

Question 6 continued

DO NOT WRITE IN THIS AREA

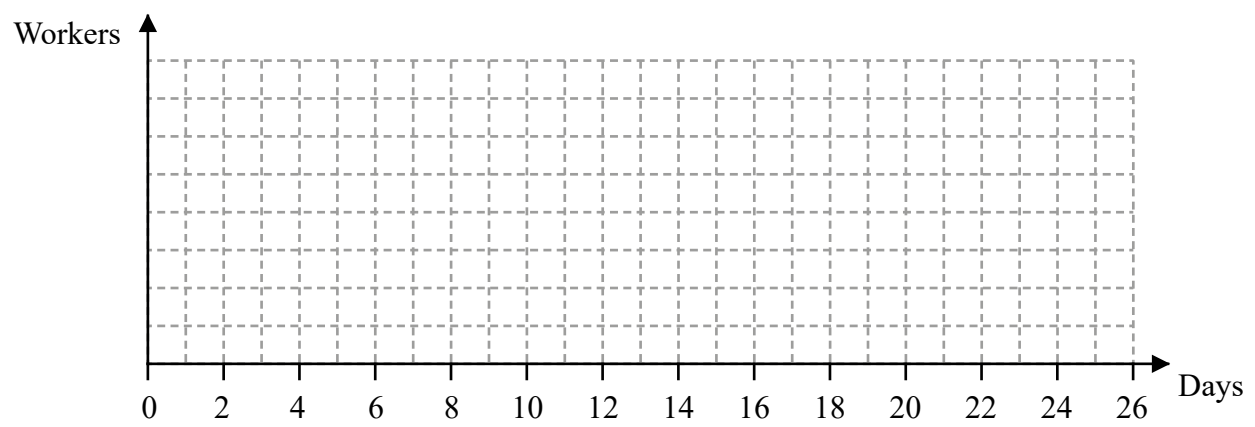
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



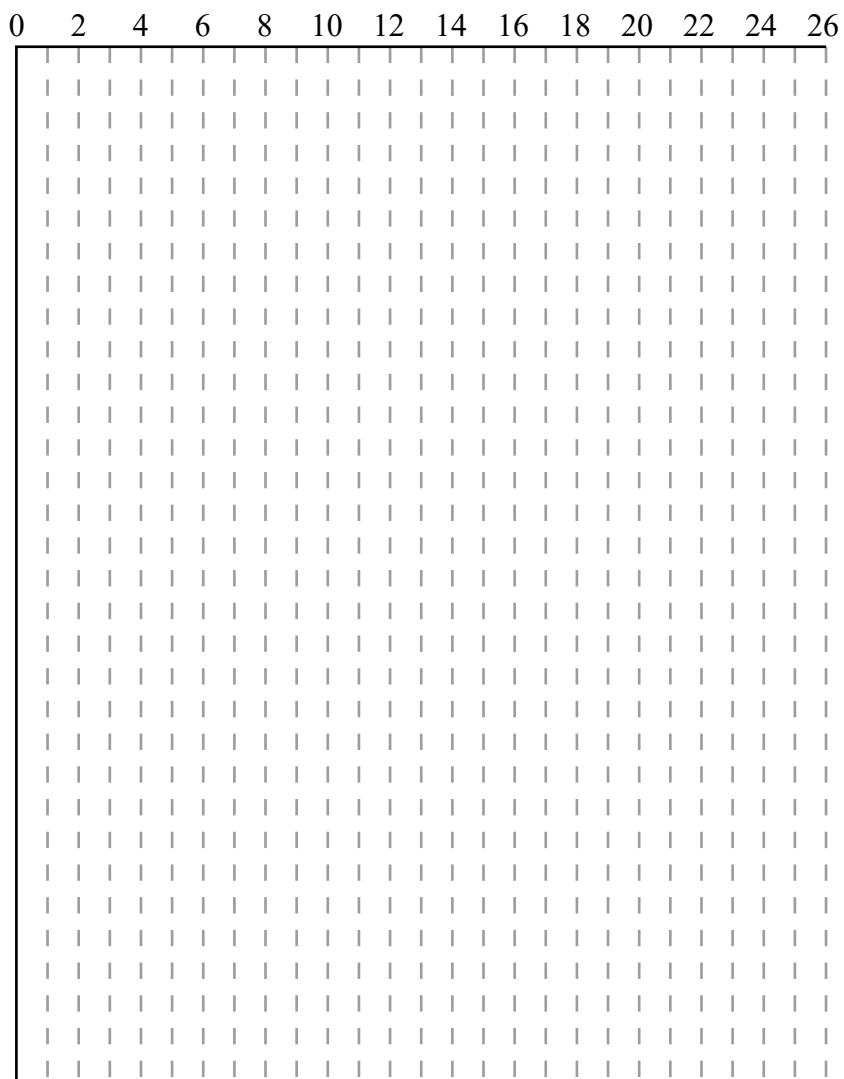
Grid 1

(There is a spare grid on the next page)



Grid 2

**Question 6 continued**



**Copy of Grid 1**

---

---

---

---

---

---

---

---

---

---

---

---

---

---

**(Total for Question 6 is 12 marks)**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

7.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

| b.v.  | $x$ | $y$ | $z$ | $s_1$ | $s_2$ | $s_3$ | $t_1$   | Value |
|-------|-----|-----|-----|-------|-------|-------|---------|-------|
| $s_1$ | 0   | 2   | 1   | 1     | 0     | 2     | -2      | 19    |
| $s_2$ | 0   | 4   | 0   | 0     | 1     | 1     | -1      | 12    |
| $x$   | 1   | 0   | 0   | 0     | 0     | -1    | 1       | 3     |
| $P$   | 0   | -2  | -2  | 0     | 0     | -3    | $3 + M$ | 9     |

| b.v. | $x$ | $y$ | $z$ | $s_1$ | $s_2$ | $s_3$ | $t_1$ | Value | Row Ops |
|------|-----|-----|-----|-------|-------|-------|-------|-------|---------|
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
| $P$  |     |     |     |       |       |       |       |       |         |

| b.v. | $x$ | $y$ | $z$ | $s_1$ | $s_2$ | $s_3$ | $t_1$ | Value | Row Ops |
|------|-----|-----|-----|-------|-------|-------|-------|-------|---------|
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
| $P$  |     |     |     |       |       |       |       |       |         |

### Question 7 continued

| b.v. | $x$ | $y$ | $z$ | $s_1$ | $s_2$ | $s_3$ | $t_1$ | Value | Row Ops |
|------|-----|-----|-----|-------|-------|-------|-------|-------|---------|
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
| $P$  |     |     |     |       |       |       |       |       |         |

| b.v. | $x$ | $y$ | $z$ | $s_1$ | $s_2$ | $s_3$ | $t_1$ | Value | Row Ops |
|------|-----|-----|-----|-------|-------|-------|-------|-------|---------|
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
|      |     |     |     |       |       |       |       |       |         |
| $P$  |     |     |     |       |       |       |       |       |         |

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

(Total for Question 7 is 12 marks)

**TOTAL FOR PAPER IS 75 MARKS**

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA