



GCSE Foundation/Higher 14

Algebra



Mark scheme



73 minutes



68 marks

Graphs

M1. (a) $C = 10d + 20$

B1

(b) Plots at least two correct points ($\pm \frac{1}{2}$ sq)

M1

Correct line from (0, 30) at least to intersection at (5, 70)

A1

(c) First Cars

Strict ft

B1 ft

Cheaper (check graph)

Graph lower down

Roys Rentals = 90

and First Cars = 86

oe

B1 ft

[5]

M2. (a) 48

B1

(b) 14 (+) 20 (+) 10

oe Allow one error

M1

44

SC1 for 45

A1

(c) E to F

B1

Steepest (gradient)

oe

B1

[5]

M3. (a) -4, -3 and 5

All three in correct position in table

B1 one correct in correct position

B2

- (b) Their seven points plotted correctly

$$\pm \frac{1}{2} \text{ square}$$

B1 for 5 or 6 points correct

B2 ft

Six or seven points joined by smooth curve

Must be a U shape

B1

- (c) Line drawn at $y = 2$

B1 ft

- (d) $(x =) -2.45$

ft their graphs $\pm \frac{1}{2}$ square

Accept $[-2.6, -2.3]$

Accept $-\sqrt{6}$

B1 ft

$(x =) 2.45$

ft their graphs $\pm \frac{1}{2}$ square

Accept $[2.3, 2.6]$

Accept $\sqrt{6}$

Note: if coordinates are given, mark the x coordinates only

Award B1 B0 if both are correct.

B1 ft

[8]

- M4.** (a) $C = 8d + 16$

Last one

B1

- (b) Plots graph ... at least two correct coordinates for $C = 9d + 11$

Works out costs for at least 2 days for Woods Tool Hire ... 20, 29, 38, 47, 56 ... (minimum of 2 of these)

M1

Correct straight line to intersection at (5, 56)

Identifies equal cost for 5 days

A1

No ticked with valid statement

No may be implied

eg cheaper up to 4 days, equal costs for 5 days, more expensive for 6 days onwards

A1

Alternative method 1

$$8d + 16 = 9d + 11$$

M1

$$d = 5$$

A1

No ticked with valid statement

No may be implied

eg cheaper up to 4 days, equal costs for 5 days, more expensive for 6 days onwards

A1

Alternative method 2

$$9 \times \text{their } d + 11$$

$$\text{their } d \geq 5$$

M1

Correct calculation

A1

Corresponding correct value from

Branch Tool Hire **and** No ticked

No may be implied

From graph or using correct formula

A1

[4]

M5. (a) Plan A

B1

Valid reason

eg cheaper (for 800 minutes)

B1

(b) Attempt at any two readings from Plan B slope

eg (600, 30), (700, 60), (800, 90), (900, 120), (1000, 150)

need not be coordinates eg 600(min), (£)30 or (£)30, 600(min)

M1

Compares cost and time or $6000 \div 200$ or $60 \div 200$

oe

eg (£)30 in 100 (minutes) (£)120 in 400 (minutes)

M1 dep

30p or £0.30

A1

[5]

| | | | | |
|------------|-----|----------------------------------------------------------------------|-----------|------------|
| M6. | (a) | [49 - 50] | B1 | |
| | (b) | [6.6 - 6.8] (- 5) <i>Numbers could be seen on graph</i> | M1 | |
| | | [1.6 - 1.8] SC1 [1.3 - 1.4] or SC1 for 1 (MR of Vicki for Pat) | A1 | [3] |

| | | | | |
|------------|-----|------------------------------------------------------------------------------------------------------|---------------|------------|
| M7. | (a) | $C = 10d + 5$ | B1 | |
| | (b) | Correct substitution of a value for d in formula 20, 25, 30 | M1 | |
| | | Identifies equal pay at $d = 2$ | M1 dep | |
| | | No and cheaper at $d > 2$ oe | A1 | |
| | | Alternate method | | |
| | | Plots at least two correct coordinates on graph for mountain bike (0, 15) (1, 20) (2, 25) (3, 30) | M1 | |
| | | Correct line at least as far as intersection at (2, 25) | M1 dep | |
| | | No and cheaper at $d > 2$ | A1 | [4] |

| | | | | |
|------------|-----|--------------------------------------------------------------------------------------------|-----------|--|
| M8. | (a) | Line from (9 am, 0) to (2 pm, 30) | B1 | |
| | | Line from (12, 0) to (1, 20) plus 30 minute break, then line from (1:30, 20) to (2 pm, 30) | B1 | |
| | | 2 (pm) | B1 | |

Alt 1

Table or list of values showing steady speed of 6 km/h for at least 3 values

eg, (10, 6), (11, 12), (12, 18), (1, 24), (2, 30)

B1

Table or list of values showing steady speed of 20 km/h with break to at least (1:30, 20)

eg, (1, 20), (1:30, 20), (2, 30) [(2:30, 40)]

B1

2 (pm)

B1

Alt 2

$$6x = 20(x - 3 - 0.5)$$

M1

$$x = 5 \text{ hours}$$

A1

2 (pm)

A1

- (b) Line from their '(2 pm, 30)' with gradient 50 km/h

$$30 \div 50 (= 36 \text{ minutes})$$

M1

1:23 – 1:25 (pm)

Their (a) – 36 minutes

A1 ft

Alt 1

Table of values back from their '(2, 30)' for at least 1 hour

eg, (1, 5)

B1

1:23 – 1:25 (pm)

Their (a) – 36 mins

B1 ft

Alt 2

$$30 \div 50 (= 0.6\text{h} = 36\text{m})$$

M1

1:24 (pm)

Their (a) – 36 mins

A1ft

[5]

M9. (a) 10 minutes

B1

(b) (i) Last section indicated

B1

(ii) Steepest line

oe

Do not accept 20 km in 20 mins and 25 km in 50 mins

Do not accept greater distance in shorter time

B1dep

[3]

M10. (a) $0 \rightarrow -1$ and $2 \rightarrow 3$

B1

(b) Straight line passing through
 $(-1, -3)$, $(0, -1)$, $(1, 1)$, $(2, 3)$ and

$(3, 5) \pm \frac{1}{2}$ small square

B1 $(-1, -3)$, their $(0, -1)$, $(1, 1)$, their $(2, 3)$ and

*$(3, 5)$ plotted correctly $\pm \frac{1}{2}$ small square
or Line through three or four correct points*

B2

[3]

M11. (a) Two points calculated or plotted

B1 For each point or $(-1, -5)$

B1 Line through $(0, -3)$ $(0, -3)$

B1 Line gradient 2 $(1, -1)$

$(2, 1)$

$(3, 3)$

$(4, 5)$

B2

Straight line drawn

B1

- (b) Attempt to read off at $y = 4.5$ or $2x = 7.5$
or 4.5 as y coordinate

B1

3.75

ft Their graph

$\pm 1 \text{ mm } (\frac{1}{2} \text{ square})$

B1 ft

[5]

M12. (a) -2

B1

- (b) Correct graph between -3 and 3 with 'good' curve through correct points $\pm 2 \text{ mm}$

B1ft 6 points correctly plotted, ft (their) (-1, -2)

B2

[3]

M13. (a) Yes and full explanation
eg, $-5 = 3 \times -2 + 1$ or $-5 = -6 + 1$
or $3 \times -2 + 1 = -5$ or $-6 + 1 = -5$

E1 For Yes and partial explanation

*eg, values work in equation or $3 \times -2 + 1$
or $-6 + 1$*

E2

- (b) Line 'parallel' to existing line

B1

Line intersects y -axis between $1\frac{1}{2}$ and 4 cm above x axis

B1

- (c) $3x = y - 1$

M1

$$x = \frac{y-1}{3}$$

A1

[6]

M14. (a) Correct plot

B1

(b) Can win with either (2, 3) or (6, 3) Both cannot be blocked

or Ali can only block one side, Sasha can go at the other side

Full explanation E2

Partial explanation E1

*eg two possible places to win **or** Can win
with either (2, 3) or (6, 3)*

E2

[3]

M15. (a) 8

B1

(b) Not moving

Same distance from Newcastle oe

B1

(c) 16

B1

(d) Their 16/2

M1

8

A1 ft

(e) Line or curve from (10.00, 20) to (11.00,0)

B1

[6]

