



GCSE Foundation/Higher 22

Handling Data



Mark scheme



65 minutes



58 marks

Representing data

M1. (a) Stem 4, 5, 6, (7) and suitable key

B1

Leaves
6 8 9
1 2 3 3 5 7 9
0 1 4 5
2

B1 one error

Unordered is one error

B2

Stem, leaves and aligned correctly to show distribution

Strand (ii)

Logical organised working

Q1

(b) 55

ft their stem-and-leaf

B1 ft

(c) $0.05 \times \text{their } 55 (= 2.75)$

oe their 55 must be < 59

M1

their 55 + their 2.75 (= 57.75)

or

59 – their 2.75 (= 56.25)

M1 dep

Yes and 57.75

or Yes and 56.25

ft their 55 only

A1 ft

Alternative method 1

59 – their 55 (= 4)

their 55 must be < 59

M1

$\frac{\text{their } 4}{\text{their } 55} \times 100 (= 7.(...))$

oe

M1 dep

Yes and 7.(...)

ft their 55 only

A1 ft

Alternative method 2

$0.05 \times \text{their } 55 (= 2.75)$

or

59 – their 55 (= 4)

oe their 55 must be < 59

M1

0.05 × their 55 (= 2.75)
 and
 59 – their 55 (= 4)
 oe their 55 must be < 59

M1 dep

Yes and 2.75 and 4
 ft their 55 only

A1 ft

Alternative method 3

$\frac{59}{\text{their } 55}$ (× 100) or 1.07(...) or 107.(...)
 oe their 55 must be < 59

M1

their 1.07(...) – 1 or their 107.(...) – 100
 May be implied by correct final answer

M1 dep

Yes and 7.(...)
 ft their 55 only

A1 ft

Alternative method 4

1.05 seen

M1

their 55 × 1.05 or 59 ÷ 1.05
 oe their 55 must be < 59

M1 dep

Yes and 57.75
 or Yes and 56.(...)
 ft their 55 only

A1 ft

[8]

M2. 162 or 108 or 36 or 18
 ±2

B1

$\frac{\text{their } 162}{360}$ × 100 (= [44, 46])
 oe

M1

[44, 46] and Yes

A1

Alternative method 1

198 (± 2)

198 (± 2)

B1

$$\frac{\text{their } 198}{360} \times 100 (= [54, 56])$$

oe $\frac{\text{their } 198}{360} \times 100 (= [54, 56])$

M1

[54, 56] and 60 and Yes

[54, 56] and 45 and Yes

A1

Alternative method 2

162 or 108 or 36 or 18

± 2

B1

$$0.4 \times 360 (= 144)$$

oe

M1

144 and [160, 164] and Yes

A1

Alternative method 3

198

± 2

B1

$$0.6 \times 360 (= 216)$$

oe

M1

216 and [196, 200] and Yes

A1

Alternative method 4

30% or 10% or 5%

$\pm 1\%$

B1

their 30% + their 10% + their 5%

oe *At least one percentage must be in tolerance*

M1 dep

[44, 46] and Yes

A1

[3]

M3. (a) $\frac{19}{147} \times 100$ **M1**
oe

12.92(...) or 12.93
Accept 13 with M1 working seen **A1**

12.9
ft any value > 1 dp correctly rounded to 1 dp or their calculation given to 1 dp
SC1 13 (answer only) **B1 ft**

(b) (i) Stem (0), 1, 2, 3 and 4
and
suitable key
Accept 4, 3, 2, 1, (0) **B1**

Leaves
1 2 3 4 6 7 8 8
0 1 6 7 9
1 2 3 8
5
1
B1 4 rows correct
B1 complete but unordered leaves **B2**

Stem, leaves and aligned correctly
Strand (ii)
Logical, organised order of working **Q1**

(ii) 8 **B1**

(iii) 0
Accept 'none' or 'zero' **B1**

(c) Ticks the 19 late trains only

B1

States mode should now be 7

oe eg one minute less

SC1 wrong or no box ticked and states new mode is 7

B1 dep

[11]

M4. (a) (i) Sight of midpoint eg, 35

Could be their midpoint eg, 35.5

B1

One correct product

eg, $10 \times$ their midpoint (= 350) if correct

Others are $12 \times$ their 45 (= 540)

$6 \times$ their 55 (= 330)

$2 \times$ their 65 (= 130)

M1

Their 1350

30

Must be 30 and midpoints consistent

M1dep

45

A1

(ii) $\frac{22}{\text{Their } 30}$

$\left. \begin{array}{l} \text{B1 Numerator} \\ \text{B1 Denominator} \end{array} \right\} \text{Must be a proper fraction}$

oe Fraction

SC1 Correct value as decimal or % (0.73 or better)

B2

(b) (i) Correct plots at midpoints

B1 One error

Treat not joined or curve as one error

Ignore lines drawn beyond 1st and last plot

B2

(ii) Slower as peak for members is earlier

oe must reference peak, highest point or mode

B1

More varied as graph for non-members is 'wider'

oe mentions additional group

B1

- (c) Circles 39 minutes
Any indication

B1

12 people finished under 40 minutes
SC1 For 42 circled and explains 10 under 40 minutes oe

B1

[12]

- M5. (a) Fully correct bar chart

Frequencies

Walk (10), Bus (8), Car (6) and
Bike (6)

Format

Horizontal or vertical
Labelled frequency axis
Scale on frequency axis
Equal width bars correctly labelled
Condone no gaps between bars
Condone lines

Bar chart attempted

B3 **All** three frequencies correct, 1 or 2 format errors

B2 **Three** frequencies correct, 1 or 2 format errors **or**
Two frequencies correct, no format errors

B1 **No** frequencies correct, **No** format errors **or**
One frequency correct, format errors

Bar chart **not** attempted

B2 **All** frequencies correctly calculated

B1 **One** correct frequency seen **or**
 $360 \div 30$ oe or 12 seen

SC2 **All** frequencies in proportion, no format errors

SC1 **All** frequencies in proportion, format errors

B4

- (b) Correct diagram
–1eeoo

Stem (0, 1, 2)

Leaf (5, 7, 8; 0, 1, 1, 2, 4, 8; 3)

eg leaf **or** leaves not ordered
each value omitted in stem or leaf
value in incorrect leaf

B3

[7]

M6. (a) 5 + 4

or 9

M1

$$\frac{9}{30}$$

oe

A1

- (b) (2.5, 1), (7.5, 2), (12.5, 7), (17.5, 9), (22.5, 7), (27.5, 4)
joined within 1 small square, straight lines attempted

B1 One error or not joined or joined with curve
SC1 for consistent plots at lcb or ucb

B2

- (c) Correct comparison of average and spread, or
Correct comparison of average or spread and one other valid observation

eg Students average time larger oe
Allow eg in general, on average, overall
Spread of student times larger oe
Allow eg larger range, more varied ...

Other valid observations

eg More students watch from 15 to 25 h
Same number (7) watch from 10 to 15 h

B1 one correct comparison of average/spread
or one valid observation

B2

[6]

- M7.** Attempt to add at least 12 correct values from Stem and Leaf
*Values used **must** indicate that the candidates understands the stem and leaf notation.*

M1

270

A1

(Mean =) 'their 270' \div 30

Must divide by 30

M1 dep

9

No follow through

A1

[4]

- M8.** Stays the same

Shows ability to find median as middle value

This can be shown for 20 pieces or 21 pieces of data

M1

Identifying median as 19 from 20 pieces of data

19 quoted or implied as median M1 A1

A1

Identifying 19 as the median from 21 pieces of data

A1

[3]

- M9.** (a) All 8 points plotted correctly

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

*Only 6 or 7 points correct
 Ignore extra points*

B1

B2

- (b) Suitable straight line of best fit drawn

Must reach $x = 5$ and $x = 11$ and pass between (5, 5.5 to 6.5) and (11, 3.5 to 4.2) Dotted line OK

B1

- (c) The older the person the quicker they can do the test

Accept negative correlation

B1

[4]

