



GCSE Foundation 23

Handling data



228 minutes



221 marks

Representing data

M1. (a) (Medium bar \Rightarrow) 20

B1

(Large bar \Rightarrow) 6

If structure incorrect (incorrect gaps/unequal widths) award B1 max

B1

(b) 24 or 10

Seen (or implied by later work)

B1

their 24 + their 10 ($= 34$)

dep on B1

M1 dep

their 34×2

oe

M2 for their $24 \times 2 + \text{their } 10 \times 2$

M1

68

SC3 digits 68 (but not answer = 68)

SC3 64

SC2 32

A1

Alternative method

24 or 10

Seen (or implied by later work)

B1

their 24×2 or their 10×2

M1

their 48 + their 20

dep on B1

M1 dep

68

SC3 digits 68 (but not answer = 68)

SC3 64

SC2 32

A1

[6]

M2. (a) Symbol represents 10 members

B1

Correct number of symbols for one row

Basketball (1)

Netball $\left(1\frac{1}{2}\right)$

Follow through from their key (not symbol = 1)

M1

Two correct rows

ft wrong key (not symbol = 1)

A1 ft

(b) Suitable headline reflecting data

Condone any valid statement about results eg

Most people do football

More do football than all the others in total

70 people go to sports clubs

B1

(c) $40 \div 5 (= 8)$ or $40 \div 2 (= 20)$ or $2 \times 5 (= 10)$

oe

M1

4

A1

[6]

M3. (a) Germany, UK, France

B1 for one correct: Germany first

or UK second or France third

B1 30, 28, 8

B2

(b) 9

B1

(c) (Germany =) $30 + 10 + 6 + 32 (= 78)$

or

(UK =) $28 + 13 + 12 + 23 (= 76)$

or

(France =) $8 + 15 + 9 + 11 (= 43)$

Method for one country seen or implied by correct answer

Allow one error per country

M1

(Germany =) $30 + 10 + 6 + 32 (= 78)$

and

(UK =) $28 + 13 + 12 + 23 (= 76)$ (and (France =) $8 + 15 + 9 + 11 (= 43)$)

*Method for at least Germany **and** UK seen or implied by correct answer*

Allow one error per country

M1

Germany = 78 **and** UK = 76 (and France = 43)

and chooses Germany

A1

[6]

M4. (a) 50

B1

(b) Bicycle

B1

(c) 35 and 25 **chosen**

or 35 – their 25

or their 35 – 25

$3\frac{1}{2}$ and $2\frac{1}{2}$ **chosen**

or $3\frac{1}{2}$ – their $2\frac{1}{2}$ or their $3\frac{1}{2}$ – $2\frac{1}{2}$ or 1 symbol

M1

10

A1

(d) Attempts a suitable graph with 3 or 4 bars

Condone vertical line graph

M1

Heights correct 50, 35, 20, 25

ft their part (a)

A1 one error

± ½ small square

A2ft

Numerical axis correctly scaled

Linear between 0 and their tallest bar, ignore scaling beyond that

B1

Bar chart with labels **and** equal width bars **and** equal gaps

Strand (ii)

Labels may be eg frequency or number of people and car, bus, bicycle, tram

Must have gaps

Q1

[9]

M5. (a) 2005

Condone 05 but not 205

B1

(b) 2009

Condone 09 but not 209

B1

(c) 110 (billion) **chosen**

Ignore any attempt to use zeros for billion i.e. accept digits 110

B1

$\frac{9}{20} \times$ their 110 (billion)

oe eg their 110×0.45 or 5.5×9 or their $110 \div 2.2(\dots)$

Ignore any attempt to use zeros for billion

their 110 must be in the interval [88, 122] but not 100

M1

49.5

oe

Condone 49 500 000 000 or

49 500 000 000 000 for full marks ft their 110 in the interval [88, 122] but not 100

Must have appropriate place value

SC2 Digits 495

A1 ft

[5]

M6. (a) 5

B1

(b) 94 and 60 **chosen**

or 94 – their 60

or their 94 – 60

M1

34

A1

[3]

M7. Plotted at midpoints 700, 900, 1100 and 1300

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

B1

Correct heights 10, 46, 32 and 12 within class boundaries
and

correctly joined with straight lines

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

Ignore any lines before first and after last plot

SC1 Histogram with correct heights in correct class boundaries

B1

[2]

M8. (a) (i) 40

B1

(ii) their $40 + 80 + 60 (= 180)$

Allow one error or omission

M1

250 – their 180

Must subtract all three months

M1

Bar drawn to 70

SC1 bar drawn to their 70

A1

(b) $80 - 30$ or 5×10

Condone $80 - 25$ for M1

M1

50

Must show working SC1 50 no working SC1 $8 - 3 = 5$

A1

(c) (i) $80 + 50 + 30 + 70 (= 230)$

or $4 \times 50 (= 200)$

Condone $8 \times 50 (= 400)$

M1

$250 +$ their 230 + their 200

or their 400 + their 230 ($= 630$)

M1

680

$430 \Rightarrow$ M1 M0 A0

630 seen \Rightarrow M1 M1 A0

A1

(ii) $0.5 \times \text{their } 680$
oe

M1

340

A1 ft

[11]

M9. (a) (i) 20

B1

(ii) As 115 divided by 4 does not give a whole number
oe

B1

(b) (i) 75

B1

(ii) $80 + 115 + 75 (= 270)$

or

$5 + 25 + 40 (= 70)$

$115 - 25 (= 90)$

or $75 - 40 (= 35)$

M1

their 270 – their 70

their 75 + their 90 + their 35

M1 dep

200

SC1 340 or 165 or 125

A1

(c) (i) White or W

B1

(ii) Silver or S or “black or white”

or “white or black” or “B or W”

or “W or B”

B1

(d) Ticks Cannot Tell and explains that they may be in the ‘other’ category
oe

B1

[9]

M10.	(a) (i) 4, 3, 12, 9 <i>B1 three correct</i>	B2
	28 <i>ft frequencies or correct from tallies</i>	B1 ft
	(ii) $\frac{\text{their } 4}{\text{their } 28}$ <i>oe</i>	B1 ft
	$\frac{1}{7}$ <i>ft correct cancelling of any fraction</i>	B1 ft
	(b) Symbol represents 2 birds B1	
	Correct number of symbols for blackbird (3)	
	starling $\left(2\frac{1}{2}\right)$	
	sparrow $\left(1\frac{1}{2}\right)$ <i>ft their key or correct</i> <i>(not symbol = 1 unless 2 more symbols added in robin row)</i> <i>B1 ft for one or two rows correct</i> <i>Allow half bird cut anywhere</i>	B2 ft
	Their completed pictogram, symbols aligned <i>Strand (ii)</i> <i>Logical organised working</i>	Q1
	(c) 8 000 000 B1	
	8 million \div 500 000 or their 8 000 000 \div 500 000 <i>oe eg 8 \div 0.5</i> <i>Digits 16 implies M1</i>	M1
	16 <i>ft their 8 000 000 in digits</i> <i>SC1 $\frac{1}{16}$ or 0.0625</i>	A1 ft

(d) blackbird (flies away)

B1

robin (arrives)

B1

Accept any clear indication eg B, R

SC1 answers wrong way round

SC1 Robin 4, Blackbird 3

[14]

M11. (a) 8 (-) 3

M1

5

A1

(b) 8 (+) 4 (+) 5 (+) 3

Allow one error or omission

M1

20

A1

(c) Fully correct bar chart (heights 10, 2, 5)

B2 2 criteria met

B1 1 criteria met

ie bars add up to their 20 – 3

Banana (bar) = 2 × orange (bar)

Apple bar has height 2

B3

[7]

M12. (a) **B** marked at three parts

0 – – B 1

B1

C marked at 0

B1

(b) $60(^{\circ})$ or $\frac{1}{6}$ seen

± 2 or 60 walk or 50 cycle or 90 bus

B1

$$\frac{360}{\text{their } 60} \times 40$$

oe their 6×40 or $5 \times 40 + 40$

M1

240

Accept integer answer in range [232, 249]

SC2 Non-integer in range [232, 249]

A1 ft

(c) $\frac{90}{360} (\times 252)$ or $\frac{1}{4} (\times 252)$

oe

M1

63

A1

Alternative method

$$40 \times \frac{90}{\text{their } 60} + \frac{252 - \text{their } 240}{4}$$

M1

63

A1

[7]

M13. (a) $100 - 70 - 24$

or

$70 + 24 (= 94)$ and $100 - \text{their } 94$

or

$200 - 56 - 32 - 12 - 70 - 24$

oe

Accept sight of 94 or 194

M1

6

A1

- (b) Structure (equal widths)
If gaps present, must be equal
 B1
- Heights correct $\pm \frac{1}{2}$ square
 (70, 24 and their 6)
B1 ft two correct heights ft their 6
 B2 ft
- (c) Holidays abroad
 or
 Cannot tell with valid reason
Ticks Holidays abroad - more had a holiday abroad in 2011
Ticks Can't Tell - there is only one year's data
Ticks Can't Tell - references recession or weather
 oe
 B1
- (d) (Easier) for comparison
 oe
 B1

[7]

- M14.** (a) One correct method eg $0.3 \times 360 (= 108 \text{ degrees})$
 M1
- All correct angles drawn $\pm 2^\circ$
108, 72, 180
A1 one correct angle calculated or drawn
 A2
- Structure correct
Strand (iii)
3 sector pie chart with labels in correct order of size
 Q1
- (b) $5 + 3 + 2 (= 10 \text{ (cups)})$
1 cup = 8
 M1
- $80 \div \text{their } 10 \times 5$
oe their } 8 \times 5
Award M2 for } 80 \div 2
 M1
- 40
If 40 seen with cola, ignore further work
 A1

- (c) (i) Any correct comment
eg orange most in morning
If quantified must be correct

B1

- (ii) Lemonade

B1

[9]

M15. (a) 20

B1

- (b) Mathematics

- (c) (i) Attempts a dual bar chart
Allow errors if intention clear

B1

Structure correct

*Bars paired, vertical scale numbered, horizontal scale labelled,
 key/labels for Nick and Jen*

B1

Heights all correct

Using their scale, linear between

40 and 90

B1 all but one or two heights correct

B2

Alternative method 1

Turns Nick's pictogram into a bar chart, scales structure and heights correct

Vertical scale and horizontal labels

Structure including equal gaps

Heights

B2 for two correct

B1 for one correct

Max B3

Alternative method 2

Turns Jen's bar chart into a pictogram, structure, number of symbols, key

B2 two of structure, number of symbols and key

B1 one of structure, number of symbols and key

Max B3

- (ii) 3 correct comparisons
B1 ft 2 correct comparisons
eg English was Jen's best score but
Mathematics was Nick's best score ft their diagram

B2 ft

A comparative statement for Nick and Jen for one subject
 or totals or means or ranges

Strand (iii)

Q1

[9]

- M16.** (a) Valid reason

eg, new issues out

B1

- (b) Evidence of calculating total for men or women

Women 38 + 17 + 22 + 9

Men 39 + 11 + 14 + 18

M1

Correct total for men (82) and women (86)

A1

Valid conclusion

Yes as $86 > 82$

No as $86 \approx 82$

Strand (ii)

Q1

[4]

- M17.** (a) Structure correct

ie, pairs of bars, gaps between pairs

M1

Heights correct and bars equal width

A1

Vertical axis labelled and scaled (linear)

*Accept title indicating what vertical axis shows
eg, "frequency" or "how many"*

B1

Suitable key for labelling of bars

B1

(b) Sunday

B1

[5]

- M18.** (a) $\frac{2}{8}$ and $\frac{6}{24}$
B1 One correct (and one incorrect)
B1 Two correct and one incorrect
Accept any indication

B2

(b) 25

B1

(c) Likely

Accept any indication

B1

(d) Attempts a quarter circle

Be generous if intention clear

B1

[5]

- M19.** (a) Wednesday
or W or Wed
Accept 8 – 2 (= 6) or 2 – 8 but not 6 alone

B1

(b) 4 + 5 + 2 + 6

Allow one error

M1

17

SC1 Embedded 17 not linked to boys total 44 or 27 girls

A1

(c) Boys bar to height of 18 – their b

1

B1

$$36 - (7 + 6 + 8 + 6)$$

Allow one error in $7 + 6 + 8 + 6$

Allow separate bars

Allow unruléd if intention clear

M1

Girls bar to 9

SC2 Bars wrong way round

A1

(d) $\frac{8}{10}$

*B1 Numerator 8
B1 Denominator 10* } *In a proper fraction*

oe

B2

[8]

M20.

$$\frac{60}{360} \times 30$$

oe $\frac{30}{6}$

M1

5

A1

[2]

M21.	(a) (i) Shows method for tallying	M1
	Correct number of tallies <i>Must be five bar gates</i>	A1
	Frequencies W = 13, B = 10, C = 7 <i>ft Their tallies</i> <i>SC2 All correct wrong columns</i>	B1 ft
	(ii) Walking	B1 ft
	(iii) $\frac{\text{their}10}{30}$	B1 ft
(b)	(i) More Y7s come by car <i>oe eg More Year 11s by bus</i> <i>Bus more popular for Y11</i> <i>Walk most popular for Y7</i> <i>Allow direct quoting of numbers</i>	B1
	(ii) Same number walk <i>oe eg, Car least popular for both</i>	B1
(c)	Correct method seen eg, $\frac{13}{30} \times 360$ or 13×12 <i>One correct angle</i>	M1
	3 correct angles 156, 168, 36	A1
	Correct angles drawn within 2°	A1
	Labelling in correct order of size	B1
		[11]

M22.	(a) $4 + 2$ 1.5×4	M1
	6	A1

(b) 8 or 18

$$2.5 \times 4 \text{ oe}$$

M1

10

A1

(c) 0.5×64

$$64 \div 4 \div 2$$

M1

32

8 symbols

A1

Reasonable attempt at 8 symbols
ft Their 32

A1 ft

[7]

M23. (a) 3 correct bar heights

B1 One or two correct

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

B2

Bars equal width with gaps

B1

(b) $\frac{40}{60}$

oe

M1

$$\frac{2}{3}$$

A1

(c) $10 + 2 = 12$ (miss goal or hit post)

B1

Method to find 20% of 60

$$\frac{12}{60} \times 100$$

M1

= 12 so Andy is correct

= 20 so Andy is correct

A1

[8]

- M24.** (a) $57 - 38$
Sight of 38 and 57 M1
- 19 A1
- (b) 49 B1
- (c) (i) (Unchanged) – end values not affected
 oe B1
- (ii) (Changed) – there are now more 51s than 49s
 oe eg, *There are now 5 of them* B1
- [5]

- M25.** (a) $15 \div 3 \times 9$ or 15×3
 oe eg, $60 - 15$ M1
- 45
Can be recovered in (b) if missing in (a) A1
- (b) 45 (boys pass) B1 ft
- 35 (girls pass) and 25 (girls fail) B1
- [4]

- M26.** (a) 58 B1
- (b) 13 B1
- (c) 15 B1

(d) $\sum x$ at least 6 values

$$11 + 42 + 50 + 36 + 40 + 109$$

M1

their $288 \div$ their 13

M1 dep

22.(2)

22.1; 22.15(...) or 22 with working

A1

[6]

M27.

(a) Fully correct pie chart, correctly labelled with all sector angles correct (108°, 120°, 72° and 60°) (sectors $\pm 2^\circ$)

B3 4 correct sectors drawn with no/wrong labels

or

2 correct sectors drawn and 4 labels

in correct order of size

B2 2 correct sectors drawn; with no/wrong labels

or

1 correct sector drawn and 4 labels

in correct order of size

or

4 correct angles calculated

B1 1 correct sector drawn; no/ wrong labels

or

1 correct angle calculated

or

4 sectors labelled in correct order of size

B4

(b) $18 \div 60 \times 100$

oe eg $\frac{3}{10} \times 100$ or $\frac{108}{360} \times 100$

M1

30

A1

(c) Stem (1, 2, 3, 4, 5)

B1

Leaf (8) (3,9) (6,6,9) (1,3,4) (4)

B1 for 3 or 4 rows correct

B1 not ordered

B2

[9]

M28. R Y G

M 3 2 2

F 2 1 3

Table 3 × 2 or 2 × 3

If gender ignored and total number of students used M0

M1

Fully correct

Accept tally marks;

4 or 5 correct entries A1; SC2 for

M			F		
R	Y	G	R	Y	G
3	2	2	2	1	3

or

M			F		
R	3	R	2		
Y	2	Y	1		
G	2	G	3		

Or

	R	Y	G
M	3	2	2

	R	Y	G
F	2	1	3

4 or 5 correct entries SC1

A2

[3]

M29. (a) London and Moscow

B1

(b) (i) 8

B1

(ii) 9

B1

(c) False for Athens and/or Moscow

B1

Athens is about $\frac{2}{3}$ or Moscow is about $\frac{1}{3}$

or correct numerical comparison

e.g. accept

for Athens: it is maximum is 30 and to be half of the minimum should be 15

for Moscow: half of 20 is 10, not 7

do not accept

for Athens: half of 30 isn't 22

for Moscow: the difference is 13 and that's not half

B1 dep

[5]

M30. (a) 42

B1

(b) 35

B1

[2]

M31. (a) (i) True

B1

(ii) True

B1

(iii) Cannot say

B1

(b) $\left(\frac{1}{3} \times 30\right)$ or $\left(\frac{1}{2} \times 30\right)$ or 10 or 15
oe

M1

$30 - \left(\frac{1}{30} \times 30\right) - \left(\frac{1}{2} \times 30\right)$
oe

M1

5

Accept 4 eels and 1 pike

Note: $\frac{5}{30} \Rightarrow M2A0$

A1

[6]

M32. (a) $\frac{45}{360}$ or $360 \div 45 (= 8)$
 $180^\circ = 60 \text{ men}$

M1

$\frac{45}{360} \times 120$ or $120 \div "8"$
 $90^\circ = 30 \text{ men}$

M1 dep

15

$45^\circ = 15 \text{ men}$

A1

- (b) Any one correct method seen
 or any one correct angle seen

$\frac{360}{120} \times 42$ or 3×42
Can be one correct sector, labelled correctly

M1

$126^\circ, 105^\circ, 75^\circ, 30^\circ, 24^\circ$
 $4 \text{ or } 5 \text{ correct angles}$

A1

All 5 angles drawn correctly $\pm 2^\circ$
Must be only 5 sectors

A1

All 5 sectors labelled in correct order of size
Must be only 5 sectors

B1

[7]

M33. (a) $\frac{1}{2}$
 Accept 0.5 oe eg $\frac{180}{360}$, half, 50%
 NOT $180 \div 360$

B1

(b) $\frac{360}{90}$ or 4 or $\frac{1}{4} = 600$ $\frac{1}{2} = 1200$
oe Insurance clearly 1200

M1

4×600

oe $600 + 600 + 2 \times 600 = M2$
Allow sensible build up

M1

$= £2400$

A1

[4]

M34. (a) 11

B1

(b) Adding at least 6 values

Total of 72-110 → M1

M1

"total" $\div 7$

M1

$= 13$

A1

(c) Comparison of spread

Strict ft
eg Women have a bigger range
Men's range is 11 and
women's range is 14

B1 ft

Comparison of mean

Strict ft
eg Men have a bigger mean
Men's mean is 13 and
women's mean is 9
or men have more lessons
(on average)

B1 ft

[6]

M35. Any correct method

eg $\frac{400}{"800"} \times 360^\circ$

*Any one correct angle seen or implied 180°, 90°, 36° or 54°
Not 4 quarters but must be 4 sectors*

M1

All 4 angles correct

180°, 90°, 36° and 54° seen or implied

A1

4 sectors drawn accurately and correct

$\pm 2^\circ$

B1

Correct labelling, in correct proportions

Exactly 4 sectors

*Hospitals in largest sector...
Dentists in smallest sector etc
Not D & D alone*

B1

[4]

