GCSE Foundation 24

Handling Data

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218 minutes

212 marks

Interpreting and discussing results

M1. (a) 120 − 97 or 89 − 70 + 31 − 27

oe or 19 or 4 seen

M1

23

SC1 answer 46

A1

(b) 15

for Wednesday

B1

24

for Thursday

B1

(c) $\frac{30}{120}$ seen

oe fraction, decimal, percentage

M1

$\frac{1}{4}$

SC1 $\frac{15}{43}$

SC1 any seen fraction correctly cancelled to simplest form

A1

(d) $\frac{50}{150}$ or attempts to make a comparison

Seen or implied

M1

$\frac{1}{3}$ or $\left(\frac{1}{4}=\right)\frac{50}{200}$ or both values correct in appropriate comparison

Fraction/decimal/percentage

A1

Their yes with fractions with either same numerator (oe)
or same denominator
or with both values as decimals or both values as percentages
or appropriate diagrams

Strand (iii)

Supporting answers with explanations and evidence

ft their $\frac{1}{4}$ *from 3c and their* $\frac{1}{3}$

Q1

Alternative method

$\frac{150}{4}$

May be implied by diagram

M1

37.5

A1

Yes (50 > 37.5)

Q1

[9]

M2. (a) There are more 14s than others
or
14 is the most common

oe two 14s, one of everything else

B1

(b) 28

B1

(c) At least 5 values correctly rounded to nearest 10

10, 10, 20, 20, 20, 20

M1

20

A1

[4]

M3. (a) 5

B1

(b) 94 and 60 **chosen**
or 94 − their 60
or their 94 − 60

M1

34

A1

[3]

M4. (a) 44 + 38 + 48 + 55 + 60 (= 245)

Allow one error or omission

M1

their total ÷ 5

Condone 44 + 38 + 48 + 55 + 60 ÷ 5

M1

49

SC2 197

A1

(b) 41 × 40 (= 1640) or 41 × 0.4(0) (= 16.4(0))

oe

M1

60 − 41(= 19) **and**
their 19 × 10 (= 190) or
their 19 × 0.1 (= 1.9(0))

oe

M1

their 16.40 − their 1.90 or
their 1640 − their 190

dependent on M2

M1 dep

14.50

Strand (i)

Do not accept 14.5

SC2 19.90 SC1 19.9 or 1990

SC2 22.10 SC1 22.1 or 2210

Q1

[7]

M5. (a) A

B1

(b) B and says there is no correlation

oe

B1

[2]

M6. (a) (i) 4, 3, 12, 9

B1 three correct

B2

28

ft frequencies or correct from tallies

B1 ft

(ii) $\frac{\text{their } 4}{\text{their } 28}$

oe

B1 ft

$\frac{1}{7}$

ft correct cancelling of any fraction

B1 ft

(b) Symbol represents 2 birds

B1

Correct number of symbols for

blackbird (3)

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

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

ft their key or correct
(not symbol = 1 unless 2 more symbols added in robin row)
B1 ft for one or two rows correct
Allow half bird cut anywhere

B2 ft

Their completed pictogram, symbols aligned

Strand (ii)
Logical organised working

Q1

(c) 8 000 000

B1

8 million ÷ 500 000 or their 8 000 000 ÷ 500 000

oe eg 8 ÷ 0.5
Digits 16 implies M1

M1

16

ft their 8 000 000 in digits

SC1 $\frac{1}{16}$ *or 0.0625*

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]

M7. (a) (1 + 1 + 10 + 2 + 10 + 1 + 3) ÷ 7 or 1 + 1 + 10 + 2 + 10 + 1 + 3
oe Allow one error or omission

M1

4 or 28 and 35

A1

(range =) 9
Range

B1

Ed's scores are higher on average
or Danni's scores are more varied
oe ft their values for mean or totals or range
Strand (iii)
Supporting answers with explanation and evidence

Q1

Ed's scores are higher on average (or in total)
and Danni's scores have bigger range
oe
ft their values for mean or totals and range

B1 ft

(b) Danni and valid reason or Ed and valid reason
eg (Danni) only one that scored 10 (Ed) more consistent

B1 ft

[6]

M8. (a) One correct method eg 0.3 × 360 (= 108 degrees)

M1

All correct angles drawn ±2°
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 (cups))

1 cup = 8

M1

80 ÷ their 10 × 5

oe their 8 × 5

Award M2 for 80 ÷ 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]

M9. (a) 0, 7, 12
or 0, 7, 29
or 3, 7, 12
or 3, 7, 29
or 5, 7, 12
or 5, 7, 29

Any order

B1

(b) 0, 3, 7
or 0, 5, 7
or 5, 7, 12

Any order

B1

(c) Correct method for the mean of any three numbers

M1

0, 3, 12
or 0, 5, 7
or 0, 7, 29
or 3, 5, 7
or 3, 7, 29
or 5, 7, 12
or 7, 12, 29

Any order

A1

(d) 5, 12, 29 (any order)
Range 24 median 12

B2 correct values, median and/or range wrong or missing

B1 incorrect values but median and range correct for them

SC1 any student who gives 29 as range and 6 as median

B3

Alternative method

for students using **all** 6 numbers for the range (29) or median (6)

Also award B3 for any of these sets

Numbers (any order)	Range	Median
0, 3, 12	12	6
0, 3, 12	29	6
0, 3, 12	12	3
0, 5, 12	12	6
0, 5, 12	29	6
0, 5, 12	12	5
0, 7, 12	12	6
0, 7, 12	29	6
0, 7, 12	12	7
5, 12, 29	29	6
5, 12, 29	24	6
5, 12, 29	29	12

SC1 any student who gives 29 as range and 6 as median

B3

[4]

M10. (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]

M11. (a) (i) 51

B1

(ii) Orders the values

Either way
Allow one error or omission

M1

51

Must come from all 11 numbers correctly ordered

A1

Alternative method

Orders only first 6 or last 6 numbers correctly

M1

51

A1

(iii) Attempts to add values

At least 51 + 50 + … seen (= 550)

M1

their 550 ÷ 11

M1 dep

50

SC3 working and correct answers to (a)(ii) and (a)(iii) swapped over

A1

(b) (i) Mean/mode/median are 50 or above

oe All but one are 50 or more

B1 ft

(ii) One bag is 43

oe Sample size too small

One (or some) bag(s) have less than 50

B1 ft

(c) Take a larger sample

oe Need more data

B1

Spread the sample out over days

oe Sample at random

B1

[10]

M12. (a) Sheet with 10 rows or columns and a section for distance and fare

Deduct a mark if not complete

B2

(b) Longer taxi rides always cost more and cost per mile should be about same

oe

B1

(c) (i) £4.60 - £5.00

B1

(ii) Line of best fit

Fares about double distance

M1

14

ft their line of best fit

A1

(d) Yes, positive correlation

Accept: No, correlation is weak positive

B1

[7]

M13. (a) 7

B1

(b) 7

ft or correct

B1ft

[2]

M14. (a) 1 (hour) 10 (minutes)

B1

(b) 20 – 5

M1

15

A1

(c) Orders data

0, 0, 5, 5, 5, 10, 15, 20, 30 allow one error

M1

Shows choice of middle value **clearly**

SC1 Full description in words without values shown

A1

(d) For mean attempts to add up all values and divides by 9

$\frac{135}{9}$

M1

Mean = 15

In table or working but table wins

A1

(e) (i) Smaller mean minutes late

Journey times (same or) shorter

oe has fewer big late values

Must be comparative statement

B1

(ii) Smaller median minutes late

Smaller mode of minutes late

oe on time more often

Must be comparative statement

B1

(f) Fare prices could be compared or quality of the bus (or service) could be considered

oe - value for money, pick up points any sensible suggestion

Do not accept further references to tabulated data

B1

[10]

M15. (a) Circles (2, 73)

Any clear indication

B1

This is an outlier / extreme value

Does not follow pattern

oe eg, far more lessons than expected

B1 dep

(b) Line of best fit

Must pass between (1, 15) and (1, 25) and (5, 65) and (5, 80)

B1

(c) (i) Their reading from their line of best fit at $x = 4$

ft A line of best fit with a positive gradient (intended straight)

M1

Their reading – 40 evaluated correctly

A1 ft

(ii) Quite a small sample or mention of any other variable which may confound

eg, depends on age / instructor / examiner etc
Jeff better than ave / worse than ave

Allow incorrect or irrelevant statements as long as they are not contradictory

B1

[6]

M16. (a) Median = 2

B1

Mode = 1

B1

(b) 5,5 gives 5, 5, 5, 5, 6
Median = mode = 5

6,6 gives 5, 5, 6, 6, 6
Median = mode = 6

5,6 gives 5, 5, 5, 6, 6
Median = mode = 5

E2 For 2 correct medians and modes and reordering shown or for all 3 correct medians and modes but reordering not shown

E1 For 1 correct median and mode and reordering shown or for 2 correct medians and modes but reordering not shown

E3

[5]

M17. Total 20, seen or implied

M1

4 different numbers totalling 20
eg, 3, 4, 6, 7

A1

[2]

M18. (a) Order the numbers
Allow 1 number missing or repeated

M1

6

A1

(b) (i) $\frac{3}{9}$

oe 0.33 or better

B1

(ii) CAB

B1 For sight of two correct probabilities correctly assigned

A = $\frac{3}{9}$ *B* = $\frac{4}{9}$ *C* = $\frac{2}{9}$

(Accept 3, 4, 2 for B1)

B2

[5]

M19. (a) Any 3 different numbers that total 90

B1

(b) Any 2 equal numbers and a third smaller with total 90

B1

(c) Evidence of searching for 2 equal and one half the other

$x + x + \frac{1}{2}x = 90$ *or* $2.5x = 90$

M1

36, 36, 18

SC 12, 12, 6 B1

A1

[4]

M20. 5, 5, 7, 8

4 numbers with mode 5 B1

4 numbers with median 6 B1

4 numbers with range 3 B1

B3

[3]

M21. (a) Halfway between 2 and 4 (when data is put in order)

(Might be use of arrow in ordered list)

oe B1 correctly orders data but does not get B2

B2

(b) $\frac{2}{5}$

B1 Correctly orders the numbers
B1 40% or equivalent fraction

B2

(c) *a*, 3, 3, 3, *b*, *c*

Where a < 3 b, c ≥ 3
B1 Any set of six numbers with median = 3

B2

[6]

M22. (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]

M23. (a) 1 pm

oe eg, 13:00

B1

(b) Attempts to sum the values

Sight of 70

M1

Attempts to divide Their sum by 7

M1dep

10

A1

(c) Friday, because there are more people waiting on a Friday

oe B1 Friday, reason attempted
strict follow through from their (b)

B2ft

Alt

Cannot tell, one set of data for each day is not enough

oe B1 Cannot tell, reason attempted

B2ft

[6]

M24. (a) 2 + 1 and $\frac{1}{5}+\frac{1}{3}$ attempted

M1

$\frac{3}{15}+\frac{5}{15}$

Correct common denominator and at least one common numerator

M1

$3\frac{8}{15}$

oe Fraction

A1

Alt

$\frac{11}{5}+\frac{4}{3}$

At least one correct

M1

Their $\frac{33}{15}+\frac{20}{15}$

Correct common denominator and at least one correct numerator for their improper fractions (at least one correct)

M1

$\frac{53}{15}$

oe Fraction

A1

(b) Correct plots for final 5 points

B1 For four correct plots

B2

(c) Ian

(60, 48)

B1

(d) Draws suitable line of best fit

Straight line only and positive gradient.

M1

Answers in range 65 – 75

lobf not required for M1 A1

A1

[8]

M25. (a) 0 0 1 1 1 3 4 4 6 20

At least first 6 or last 6 in correct order

M1

2

A1

(b) $\sum x \div 10$

Allow $38 \leq \sum x \leq 42$ *if no addition seen*

M1

4

A1

(c) Median - omits rogue value

or

Mean - uses all values

B1

[5]

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 ÷ their 13

M1 dep

22.(2)

22.1; 22.15(…) or 22 with working

A1

[6]

M27. (a) Arranging in order

25, 26, 28, 30, 35, 39

M1

29

A1

(b) Attempt to add all 6 (= 183)

M1

Their 183 ÷ 6

If no total shown brackets must be round their added numbers
ie (28+.... +26) ÷ 6

DM1

30.5

A1

(c) $\frac{2}{5}$

oe; numerator, B1; denominator, B1 (fraction ≤ 1)

B2

[7]

M28. As a general rule for money answers, if £4.20 is the correct answer then: Accept £4.20p and 420p with the £ sign crossed out; penalise £4.2 and £420p

(a) £200

Allow names, Apprentice and/or Cleaner

B1

(b) Put data in order

M1

£350

Foreman

A1

(c) 200 + 200 + 350 + ...

Attempt to add the 7 numbers; total underneath column OK

M1

Their 2940 ÷ 7

M1 dep

£420

A1

(d) Average is for the whole company not just for the mechanic

Mechanic only gets £250 oe he gets £150 less (than average)

B1

[7]

M29. (a) London and Moscow

B1

(b) (i) 8

B1

(ii) 9

B1

(c) False for Athens and/or Moscow

B1

Athens is about 2/3 or Moscow is about 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) 5

B1

(b) 6

B1 for rearranging data

B2

(c) Mode (or their (a)) as will sell more of these

Oe

Mode as it's the most common

B1

[4]

M32. (a) £10.50 adults or £13.60 children

5.25 × 2 or 3.40 × 4

M1

24.10

A1

(b) (i) $(44 – 4 × 5) ÷ 3$

M1

8

A1

(ii) 7 adults

1 adult

B1

3 children

13 children SC1 for both numbers reversed

B1

(c) (i) Saturday

or 1

B1

(ii) Thursday

or -4

B1

(d) Attempt at Σx

At least 3 additions

M1

Their 132 ÷ 6

DM1

22

A1

[11]

M33. (a) 60

B1

(b) (i) 16

B1

(ii) No change

B1

[3]

M34. Mode = 5

B1

$\frac{24}{5}$

M1

Mean = 6

oe valid explanation
eg, mean > 5 because all the numbers are ≥ 5

A1

[3]

M35. Mode = 5

B1

$\frac{24}{5}$

M1

Mean = 6

oe valid explanation
eg, mean > 5 because all the numbers are ≥ 5

A1

[3]