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GCSE MATHEMATICS • DATA & STATISTICS

Charts & Diagrams

Worked Solutions

Pearson Edexcel GCSE (1MA1) & International GCSE (4MA1) • Calculator allowed

Full worked solutions for the free Charts and Diagrams worksheet, GCSE and iGCSE Maths



Tap a section to jump straight to it

Full worked solutions for every question on the Charts & Diagrams worksheet, in the same order and with the same question numbers.

How to mark your work. Tick each step you got right, not just the final answer. In the exam, method marks are given for correct working even when the final answer is wrong. If you lost marks, find the *first* line where your working is different from ours. That is the thing to fix.

In Section E: **M** = method mark, **P** = process mark, **A** = accuracy mark, **B** = independent mark, **C** = communication mark.

Question sheet

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A**Your turn answers**

Compare each line of your working with the solution.

FOUNDATION

A1 $360 \div 45 = 8^\circ$ per person $15 \times 8, 20 \times 8, 10 \times 8$: $120^\circ, 160^\circ, 80^\circ$

A2 $\frac{75}{360} \times 120 =$ **25**

A3 Values: 41, 46, 50, 52, 52, 55, 58, 63, 67, 69 Median = $\frac{52+55}{2} =$ **53.5** Range = $69 - 41 =$ **28**
Mode **52**

A4 $(x+20) + 2x + (3x-20) = 360$, so $6x = 360$ and $x = 60$ $80^\circ, 120^\circ, 160^\circ$

HIGHER

A5 $X: \frac{200}{360} \times 180 = 100$ $Y: \frac{162}{360} \times 240 = 108$ **Y**, with **108** customers

A6 Midpoints 25, 35, 45, 55: $(25, 2), (35, 7), (45, 10), (55, 5)$

A7 A: 42, 47, 50, 53, 56, 59, 61: median **53** B: 45, 48, 51, 54, 54, 62, 66: median **54**

B**Fluency solutions**One mark for each correct part. The notes in *italics* explain why each sequence was chosen.**FOUNDATION**

B1 (a) **8** (b) $8+6+3+5+2 =$ **24** (c) $8-3 =$ **5** (d) $\frac{6}{24} =$ $\frac{1}{4}$

B2 (a) $360 \div 60 =$ 6° (b) $15 \times 6 =$ 90° (c) $150 \div 6 =$ **25** (d) 35% of 60 = 21, $21 \times 6 =$ 126°

B3 (a) **12** (b) $4+4+2 =$ **10** (c) $4+3 =$ **7** (d) two whole symbols and a quarter: 
Each quarter of a symbol is 1 book.



B4 (a) 21 (b) 8th value: 34 (c) $52 - 21 = 31$ (d) 34

B5 (a) 1 (b) $3 + 6 + 5 + 4 + 2 = 20$ (c) $\frac{0 + 6 + 10 + 12 + 8}{20} = \frac{36}{20} = 1.8$

B6 (a) a bar chart or a pie chart: the data are categories (b) a pie chart: it shows parts of a whole
(c) a frequency polygon or a histogram: grouped continuous data (d) a stem-and-leaf diagram: it keeps every value

HIGHER

B7 (a) 45 (b) $120 - 84 = 36$ (c) $30 + 36 = 66$ (d) $\frac{36}{120} \times 100 = 30\%$

Read each section as the difference between its top and bottom.

B8 (a) 2, 6, 10, 14, 18 (b) (2, 3), (6, 7), (10, 9), (14, 5), (18, 1) (c) $8 < t \leq 12$ (d) 13th value:
 $8 < t \leq 12$

B9 (a) $\frac{160}{360} \times 90 = 40$ (b) $\frac{90}{360} \times 120 = 30$ (c) $\frac{90}{360} = \frac{1}{4}$ (d) $\frac{70}{210} = \frac{1}{3}$

B10 A: 14, 19, 22, 25, 25, 28, 31, 36, 40 B: 11, 20, 23, 24, 27, 32, 35, 38, 44

(a) 25 (b) 27 (c) $40 - 14 = 26$ (d) $44 - 11 = 33$ Read the left-hand leaves from right to left.

C

Reasoning solutions

Your wording can be different. Check that your reason makes the same point.

FOUNDATION

C1 Tom used the frequencies as the angles. Each student is $360 \div 36 = 10^\circ$: $120^\circ, 90^\circ, 150^\circ$

C2 The leaves are not in order. Correct:

1	2 5 8
2	0 4 7

Key: 1 | 2 means 12



C3 A pie chart shows fractions of each school, not numbers. If the schools have different numbers of students, the same angle can mean different numbers of people.

C4 $\frac{18}{45} \times 360 = 144^\circ$, as required

HIGHER

C5 Kai plotted at the ends of the classes. Points go at the midpoints: **5, 15, 25**

C6 A composite bar chart is better for comparing the totals and the parts of each total. A dual bar chart is better for comparing the same category across groups, because the bars start from 0 side by side.

C7 The key says the value is 3.4, not 34. The values are 2.7, 3.4 and 4.1 Range = $4.1 - 2.7 =$ **1.4**

C8 (a) $\frac{26}{360} \times n = \frac{13n}{180}$ must be whole, and 13 and 180 have no common factor, so n is a multiple of 180

180

(b) Also $\frac{75}{360} \times n = \frac{5n}{24}$ must be whole, so n is a multiple of 24. The smallest multiple of both 180 and 24 is

360

(c) The total must be a multiple of 360, and 500 is not.

D

Problem solving solutions

There is often more than one correct method. Any complete, correct method scores full marks.

FOUNDATION

D1 $360 \div 120 = 3^\circ$ per student School dinner $150 \div 3 = 50$, home $90 \div 3 = 30$ **20** more

D2 Wednesday = 20, so Friday = 40: four whole symbols

Total = $30 + 25 + 20 + 35 + 40 =$ **150** cakes

Fri 

D3 Marks of 30 or more: $6 + 4 + 2 = 12$ of 21 $\frac{12}{21} \times 100 = 57.1\%$ **57.1**%

D4 $360 \div 40 = 9^\circ$ for each student. Every sector is a whole number of students, so every angle is a multiple of 9°



HIGHER

- D5** (a) Boys: $160 < h \leq 170$ Girls: $150 < h \leq 160$
 (b) $12 + 6 = 18$
 (c) The boys' polygon is further to the right, so the boys are generally taller.
- D6** (a) $50 - 35 = 15\%$ (b) $15\% \text{ of } 400 = 60$ (c) Walk $48\% = 120$, cycle $20\% = 50$: 70 more
- D7** Walk 50° , bus 85° , car 170° , other $360 - 305 = 55^\circ$ $360 \div 72 = 5^\circ$ per person
 walk 10 , bus 17 , car 34 , other 11
- D8** (a) A : 13, 17, 20, 24, 28, 31, 35, so the median is 24. B has 8 values: 11, 16, 19, $20 + x$, 26, 29, 33, 40
 Median of $B = \frac{(20 + x) + 26}{2} = 24$, so $20 + x = 22$ $x = 2$
 (b) Mean of $A = \frac{168}{7} = 24$. Mean of $B = \frac{194 + x}{8}$, which equals 24 only if $x = -2$. A digit cannot be negative, so the means are never equal.

E

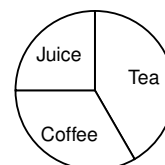
Exam practice solutions

Marks are shown on the right of each line.

FOUNDATION

Foundation and Higher crossover

- E1** (a) 12 B1
 (b) $12 + 5 + 8 + 3 + 2 = 30$ B1
 (c) $\frac{5}{30} = \frac{1}{6}$ B1
- E2** (a) $360 \div 60 = 6^\circ$ per person
 Tea 25×6 , coffee 20×6 , juice 15×6
 $150^\circ, 120^\circ, 90^\circ$
 (b) Angles drawn within 2° , sectors labelled



M1 M1 A1 B1



E3 (a) Ordered, with a key

(b) 6th value: **34**

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

Key: 2 | 2 means 22

B2 B1

E4 (a) $3.5 \times 8 =$ **28**

(b) $18 \div 8 = 2.25$ symbols

Tue 

B1 M1 A1

E5 The vertical axis does not start at 0, so *B*'s bar looks about three times as tall

C1

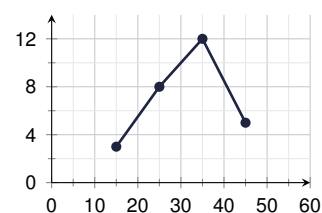
B sold 102 and *A* sold 95, only a little more; the axis has no label

C1

HIGHER

E6 (a) Points at the midpoints 15, 25, 35, 45, joined with straight lines

(b) $30 < t \leq 40$



B2 B1

E7 A: $\frac{72}{360} \times 300 =$ **60**

M1

B: $\frac{54}{360} \times 500 =$ **75**

M1

No: 75 walk at *B*, more than at *A*

C1

E8 Team *A*: median **47**, range **25**

B1 B1

Team *B*: median **49**, range **36**

B1

Team *B* scored higher on average, but its scores were more spread out

C1

E9 (a) $2x + 3x - 10 + x + 40 + 90 = 360$

M1

$6x + 120 = 360$, so $x =$ **40**

A1

(b) $3x - 10 = 110^\circ$ is 33 people, so 1° is 0.3 people

M1

$2x = 80^\circ$: **24** $x + 40 = 80^\circ$: **24** 90° : **27**

M1 A1

