

MATHS



MODEL ANSWERS

DATA

SCORE

/92

PERCENTAGE

%

STEM UP

1 Write down whether each type of data is discrete, continuous or categorical (qualitative).

(a) The time taken to run 100 metres

(b) The type of pet owned

(c) The favourite colour of each pupil

(a) The time taken to run 100 metres:
continuous

(b) The type of pet owned: categorical

(c) The favourite colour of each pupil:
categorical

(a) continuous (b) categorical
(c) categorical

1 / 1

2 Here are the marks of pupils in a test.

34, 39, 32, 34, 21, 18, 18, 23, 15

Work out the mean.

$$\text{total} = 34 + 39 + 32 + 34 + 21 + 18 + 18 + 23 + 15 = 234$$

$$\text{mean} = 234 \div 9 = 26$$

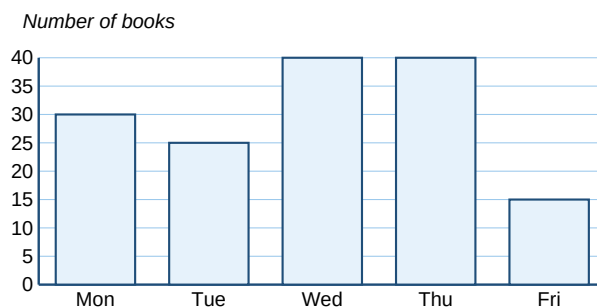
26

1 / 1

3 The bar chart shows the number of books borrowed each day.

(a) Write down the value for Thu.

(b) How many more are there for Thu than for Tue?



(a) read the bar for Thu: 40

(b) Tue = 25: $40 - 25 = 15$

(a) 40 (b) 15

1 / 1

4 Write down whether each type of data is discrete, continuous or categorical (qualitative).

- (a) The number of children in a family
- (b) The temperature of a room
- (c) The mass of a parcel

(a) The number of children in a family:

discrete

(b) The temperature of a room: continuous

(c) The mass of a parcel: continuous

(a) discrete (b) continuous (c)
continuous

/ 1

5 Here are the heights, in cm, of some plants.

28, 3, 31, 58, 11, 16

Work out the mean.

$$\text{total} = 28 + 3 + 31 + 58 + 11 + 16 = 147$$

$$\text{mean} = 147 \div 6 = 24.5$$

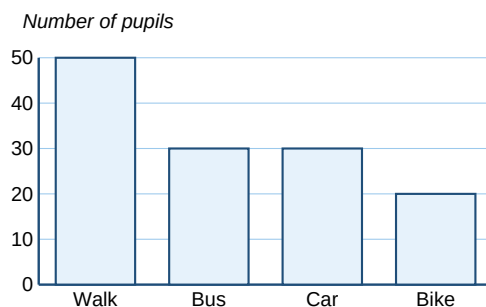
24.5

/ 1

6 The bar chart shows how pupils travel to school.

(a) Which is the most popular? Write down its value.

(b) Work out the total of all the bars.



(a) the tallest bar is Walk at 50

(b) $50 + 30 + 30 + 20 = 130$

(a) Walk, 50 (b) 130

/ 1

- 7 The pictogram shows information about the cars sold each month.
(a) How many cars are shown for Feb? (b) Work out the total number of cars shown.



(a) $3.5 \text{ symbols} \times 4 = 14$
(b) add all rows: $10 + 14 + 4 + 14 = 42$

Key:

○ represents 4 cars

(a) 14 (b) 42

1 / 1

- 8 Here are the heights, in cm, of some plants.
25, 12, 2, 33, 37
Work out the mean.

$$\text{total} = 25 + 12 + 2 + 33 + 37 = 109$$

$$\text{mean} = 109 \div 5 = 21.8$$

21.8

1 / 1

- 9 Here are the favourite sports of the pupils in a survey of 20 pupils.
tennis, football, rugby, rugby, rugby, netball, netball, rugby, football, netball, football, netball, football, rugby, rugby, netball, football, football, football, netball
Complete the tally chart and frequency table.

Item	Tally	Frequency
football		
netball		
tennis		
rugby		

tally each item and count
football: 7
netball: 6
tennis: 1
rugby: 6
total = 20

football 7, netball 6, tennis 1,
rugby 6

1 / 1

- 10 The pictogram shows information about the cars sold each month.
 (a) How many cars are shown for Mar? (b) Work out the total number of cars shown.



Key:

○ represents 2 cars

(a) $3.5 \text{ symbols} \times 2 = 7$

(b) add all rows: $3 + 7 + 7 + 4 = 21$

(a) 7 (b) 21

1 / 1

- 11 Here are some numbers.
 18, 8, 12, 7, 5, 25, 8
 Work out (a) the median (b) the mode (c) the range.

sorted: 5, 7, 8, 8, 12, 18, 25

(a) middle value = 8

(b) 8 appears most often

(c) $25 - 5 = 20$

(a) 8 (b) 8 (c) 20

1 / 1

- 12 Here are the ways the pupils travel to school in a survey of 21 pupils.
 bus, walking, walking, walking, car, bus, bus, cycling, walking, car, bus, bus, car, cycling,
 walking, cycling, bus, cycling, car, bus, car
 Complete the tally chart and frequency table.

Item	Tally	Frequency
walking		
bus		
car		
cycling		

tally each item and count

walking: 5

bus: 7

car: 5

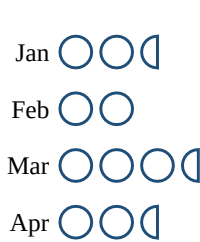
cycling: 4

total = 21

walking 5, bus 7, car 5, cycling 4

1 / 1

- 13 The pictogram shows information about the cars sold each month.
 (a) How many cars are shown for Mar? (b) Work out the total number of cars shown.



Key:

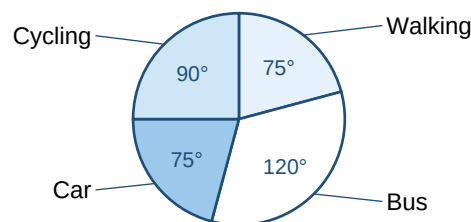
○ represents 2 cars

(a) $3.5 \text{ symbols} \times 2 = 7$
 (b) add all rows: $5 + 4 + 7 + 5 = 21$

(a) 7 (b) 21

1 / 1

- 14 The pie chart shows information about the ways some pupils travel to school.
 What fraction of the pupils chose cycling? Give your answer in its simplest form.



$$\frac{90}{360} = \frac{1}{4}$$

$\frac{1}{4}$

1 / 1

- 15 Here are the number of books read by each member of a club last month.
 1, 1, 2, 1, 1, 2, 1, 1, 2, 3, 1, 2, 0, 2, 2, 3, 3, 0, 1, 3, 0, 2, 3, 3, 0, 0
 Complete the tally chart and frequency table.

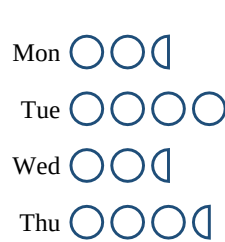
Number of books	Tally	Frequency
0		
1		
2		
3		

count each value
 0 appears 5 times
 1 appears 8 times
 2 appears 7 times
 3 appears 6 times
 total = 26

0: 5, 1: 8, 2: 7, 3: 6

1 / 1

- 16 The pictogram shows information about the number of books borrowed each day.
(a) How many books are shown for Thu? (b) Work out the total number of books shown.



Key:

○ represents 20 books

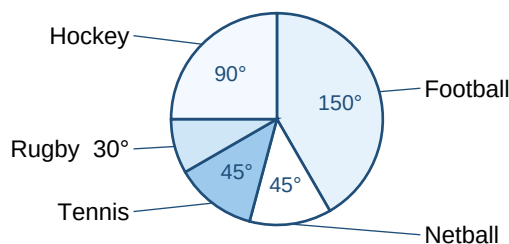
(a) $3.5 \text{ symbols} \times 20 = 70$

(b) add all rows: $50 + 80 + 50 + 70 = 250$

(a) 70 (b) 250

1 / 1

- 17 The pie chart shows information about the favourite sports of some pupils.
What percentage of the pupils chose tennis?



$45 \div 360 \times 100 = 12.5\%$

12.5%

1 / 1

- 18 Here are some numbers.
23, 15, 25, 21, 22, 3, 18, 24, 18, 11, 19, 6
Work out (a) the median (b) the mode (c) the range.

sorted: 3, 6, 11, 15, 18, 18, 19, 21, 22, 23, 24, 25

(a) middle two values 18 and 19, so $18 + 19 \div 2 = 18.5$

(b) 18 appears most often

(c) $25 - 3 = 22$

(a) 18.5 (b) 18 (c) 22

1 / 1

- 19 The pictogram shows the number of cars of each colour in a car park.
There are 40 blue cars. Complete the pictogram for blue.

Red ○○ $40 \div 20 = 2$ symbols
draw 2 full symbols in the blue row

Blue

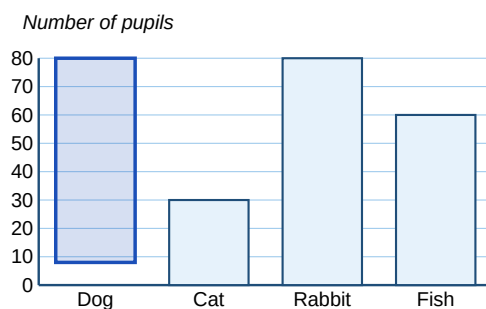
Green ○○

Key:
○ represents 20 cars

2 symbols (2 whole symbols)

1 / 1

- 20 The bar chart shows the pets owned by pupils, but the bar for Dog is missing.
There were 250 altogether. Draw the missing bar.



$250 - (30 + 80 + 60) = 80$
draw the bar for Dog up to 80

bar for Dog drawn to height 80

1 / 1

- 21 The two-way table shows information about the favourite sport of some pupils.
(a) Complete the two-way table.
(b) How many girls chose rugby?

	Football	Rugby	Tennis	Total
Boys	4	?	5	16
Girls	?	4	6	13
Total	7	?	11	?

(a) use row totals and column totals to find each missing number
row 1 column 2 = 7
row 2 column 1 = 3
row 3 column 2 = 11
row 3 column 4 = 29
(b) girls rugby: 4

(a) missing values: 7, 3, 11, 29

(b) 4

2 / 2

- 22 The pictogram shows the number of cars of each colour in a car park.
There are 15 green cars. Complete the pictogram for green.

Red ○◐

Blue ○○○

Green

White ○◐

Key:

○ represents 10 cars

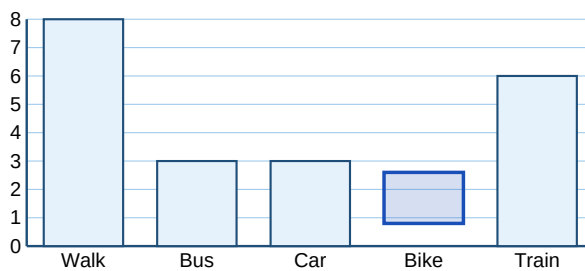
$15 \div 10 = 1.5$ symbols
draw 1 full and one half symbols in the green row

1.5 symbols (1 whole and half a symbol)

2 / 2

- 23 The table shows some information about how pupils travel to school.
The bar chart is not complete. The bar for Bike is missing.
The frequency for Bike is 2. Draw the missing bar.

Number of pupils



draw the bar for Bike up to 2 on the vertical scale

bar for Bike drawn to height 2

2 / 2

- 24 The mean of 4 numbers is 14.
3 of the numbers are 16, 18, 17.
Work out the other number.

total of all numbers = $4 \times 14 = 56$

total of the known numbers = 51

other number = $56 - 51 = 5$

5

2 / 2

- 25 The pictogram shows the number of cars of each colour in a car park.
There are 40 red cars. Complete the pictogram for red.

Red $40 \div 20 = 2 \text{ symbols}$
draw 2 full symbols in the red row

Blue ○○

Green ○○

White ○○○

Key:
○ represents 20 cars

2 symbols (2 whole symbols)

2 / 2

- 26 The two-way table shows information about the way they travel to school of some pupils.
(a) Complete the two-way table.
(b) How many boys chose bus?

	Walk	Bus	Car	Total
Boys	7	?	9	23
Girls	6	?	?	17
Total	13	?	14	40

(a) use row totals and column totals to find each missing number

row 2 column 3 = 5

row 1 column 2 = 7

row 2 column 2 = 6

row 3 column 2 = 13

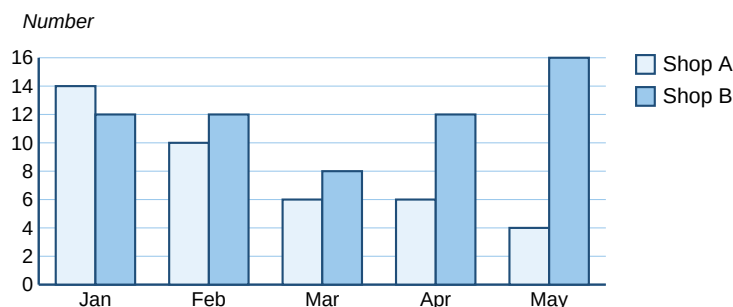
(b) boys bus: 7

(a) missing values: 5, 7, 6, 13

(b) 7

2 / 2

- 27 The dual bar chart compares Shop A and Shop B.
(a) Write down the value for Shop A on Feb. (b) On which days was the value for Shop B greater than the value for Shop A? (c) Work out the total for Shop A over the five days.



(a) read the first bar for Feb: 10

(b) compare each pair of bars: Feb, Mar, Apr, May

(c) $14 + 10 + 6 + 6 + 4 = 40$

(a) 10 (b) Feb, Mar, Apr, May (c) 40

2 / 2

- 28 The table shows information about the ways some pupils travel to school. 45 pupils were asked.

Work out the angle for each sector of a pie chart for this information.

Item	walking	bus	car	cycling
Frequency	3	20	8	14

$$360 \div 45 = 8 \text{ degrees for each person}$$

$$3 \times 8 = 24$$

$$20 \times 8 = 160$$

$$8 \times 8 = 64$$

$$14 \times 8 = 112$$

walking: 24° , bus: 160° , car: 64° ,
cycling: 112°

2 / 2

- 29 Here are the daily numbers of visitors to a museum for seven days.

38, 34, 25, 16, 21, 14, 26

Work out the range.

Explain what the range tells you about the number of visitors.

$$38 - 14 = 24$$

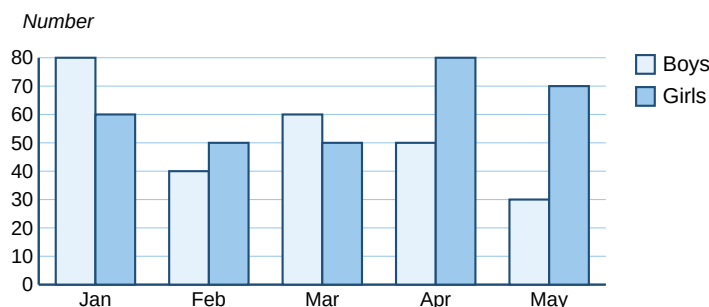
the range measures the spread of the data

24; it tells you the difference
between the highest and lowest
number of visitors (the spread)

2 / 2

- 30 The dual bar chart compares Boys and Girls.

(a) Write down the value for Boys on Mar. (b) On which days was the value for Girls greater than the value for Boys? (c) Work out the total for Boys over the five days.



(a) read the first
bar for Mar: 60
(b) compare each
pair of bars: Feb,
Apr, May
(c) $80 + 40 + 60$
 $+ 50 + 30 = 260$

(a) 60 (b) Feb, Apr, May (c) 260

2 / 2

- 31 The table shows information about the favourite fruits of some pupils. 40 pupils were asked. Work out the angle for each sector of a pie chart for this information.

Item	apple	banana	orange	grape
Frequency	19	3	4	14

$$360 \div 40 = 9 \text{ degrees for each person}$$

$$19 \times 9 = 171$$

$$3 \times 9 = 27$$

$$4 \times 9 = 36$$

$$14 \times 9 = 126$$

apple: 171°, banana: 27°, orange: 36°, grape: 126°

2 / 2

- 32 The mean of 7 numbers is 8.
A new number is added. The mean of the 8 numbers is now 10.
Work out the new number.

$$\text{old total} = 7 \times 8 = 56$$

$$\text{new total} = 8 \times 10 = 80$$

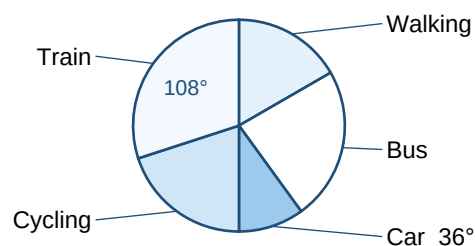
$$\text{new number} = 80 - 56 = 24$$

24

2 / 2

- 33 The pie chart shows information about the ways some pupils travel to school. 3 pupils chose car.

- (a) Work out the total number of pupils.
(b) Work out the number of pupils who chose train.



(a) 36° represents 3 people

$$1^\circ = \frac{1}{12} \text{ people}$$

$$360^\circ = 30 \text{ people}$$

$$(b) 108^\circ \times \frac{1}{12} = 9$$

(a) 30 (b) 9

2 / 2

- 34 The table shows information about the favourite fruits of some pupils. 40 pupils were asked. Work out the angle for each sector of a pie chart for this information.

Item	apple	banana	orange
Frequency	19	10	11

$$360 \div 40 = 9 \text{ degrees for each person}$$

$$19 \times 9 = 171$$

$$10 \times 9 = 90$$

$$11 \times 9 = 99$$

apple: 171° , banana: 90° , orange: 99°

2 / 2

- 35 The mean of 7 numbers is 10.
A new number is added. The mean of the 8 numbers is now 13.
Work out the new number.

$$\text{old total} = 7 \times 10 = 70$$

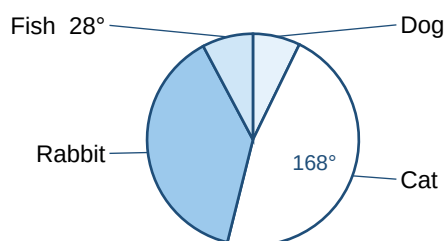
$$\text{new total} = 8 \times 13 = 104$$

$$\text{new number} = 104 - 70 = 34$$

34

2 / 2

- 36 The pie chart shows information about the favourite pets of some pupils. 84 pupils chose cat.
(a) Work out the total number of pupils.
(b) Work out the number of pupils who chose fish.



(a) 168° represents 84 people

$$1^\circ = \frac{1}{2} \text{ people}$$

$$360^\circ = 180 \text{ people}$$

$$(b) 28^\circ \times \frac{1}{2} = 14$$

(a) 180 (b) 14

2 / 2

- 37 Here are the annual salaries, in thousands of pounds, of six people in a small firm.
106, 25, 26, 24, 23, 19
Which average, the mean or the median, better represents a typical salary?
Give a reason for your answer.

$$\text{mean} = 223 \div 6 = 37.2$$

$$\text{median} = 24.5$$

one extreme value 106 affects the mean but
not the median

The median (24.5), because the
very high salary pulls the mean
(37.2) up

2 / 2

- 38 The stem and leaf diagram shows the times, in seconds, taken by 16 students to solve a puzzle.
(a) How many students took more than 34 seconds?
(b) Work out the median.
(c) Work out the range.

Stem	Leaf
2	0 1 9
3	4 8 9
4	1 5 5
5	0 2 5 7
6	2 2 7

Key: 2 | 0 means 20

(a) count the values over 34: 12
(b) 16 values, the median is the mean of
the 8th and 9th value = 45
(c) $67 - 20 = 47$

(a) 12 (b) 45 (c) 47

2 / 2

- 39 In a group, the mean mark of 20 girls is 41 and the mean mark of 30 boys is 79.
Work out the mean mark of all 50 people.

$$20 \times 41 = 820$$

$$30 \times 79 = 2370$$

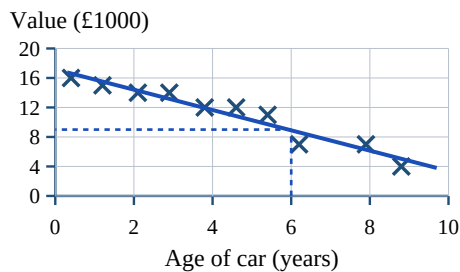
$$\text{total} = 3190$$

$$\text{mean} = 3190 \div 50 = 63.8$$

63.8

3 / 3

- 40 The scatter diagram shows the age and the value of 10 cars.
 (a) Describe the correlation. (b) Draw a line of best fit.
 (c) Use your line to estimate the value of a car when the age is 6 years.



(a) as one increases the other decreases:
 negative correlation
 (b) a straight line through the middle of the
 points with about equal points either side
 (c) go up from 6 on the horizontal axis to
 the line and across: about 9

(a) negative correlation (b) line
 drawn (c) about 9 (accept 7.8
 to 10.2)

3 / 3

- 41 The stem and leaf diagram shows the times, in seconds, taken by 16 students to solve a puzzle.
 (a) How many students took more than 34 seconds?
 (b) Work out the median.
 (c) Work out the range.

Stem	Leaf
2	3 5 5 6 8 8
3	3 7
4	1 2 4 9
5	0 2 5 7

Key: 2 | 3 means 23

(a) count the values over 34: 9
 (b) 16 values, the median is the mean of
 the 8th and 9th value = 39
 (c) $57 - 23 = 34$

(a) 9 (b) 39 (c) 34

3 / 3

- 42 In a group, the mean mark of 8 girls is 46 and the mean mark of 12 boys is 75.
 Work out the mean mark of all 20 people.

$$8 \times 46 = 368$$

$$12 \times 75 = 900$$

$$\text{total} = 1268$$

$$\text{mean} = 1268 \div 20 = 63.4$$

63.4

3 / 3

- 43 The table shows information about the time, t minutes, taken by pupils to travel to school. Work out an estimate for the mean. Give your answer correct to 1 decimal place.

Class	Frequency
$0 < t \leq 10$	6
$10 < t \leq 20$	12
$20 < t \leq 30$	2
$30 < t \leq 40$	6

midpoints: 5, 15, 25, 35

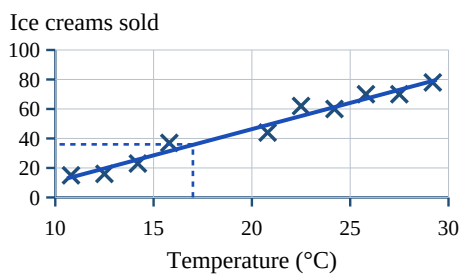
$$5 \times 6 + 15 \times 12 + 25 \times 2 + 35 \times 6 = 470$$

$$470 \div 26 = 18.1$$

18.1

3 / 3

- 44 The scatter diagram shows the temperature and the number of ice creams sold on 10 days.
 (a) Describe the correlation. (b) Draw a line of best fit.
 (c) Use your line to estimate the number of ice creams sold when the temperature is 17°C .



(a) as one increases the other increases:
positive correlation
 (b) a straight line through the middle of the points with about equal points either side
 (c) go up from 17 on the horizontal axis to the line and across: about 36

(a) positive correlation (b) line drawn (c) about 36 (accept 30 to 42)

3 / 3

- 45 The table shows the number of pets owned by each pupil in a class.
 (a) Write down the mode.
 (b) Work out the total number of values.
 (c) Work out the median.
 (d) Work out the mean.

Pets	2	3	4	5	6	7
Frequency	4	3	2	7	1	3

(a) highest frequency 7: mode = 5
 (b) $4 + 3 + 2 + 7 + 1 + 3 = 20$
 (c) median at position 10.5: 5
 (d) $2 \times 4 + 3 \times 3 + 4 \times 2 + 5 \times 7 + 6 \times 1 + 7 \times 3 = 87$
 $87 \div 20 = 4.35$

(a) 5 (b) 20 (c) 5 (d) 4.35

3 / 3

- 46 Here are the points scored in 8 matches for Team A and for Team B.

Team A: 23, 14, 11, 12, 18, 9, 12, 8

Team B: 18, 15, 19, 17, 20, 16, 12, 17

Compare the distributions. You must refer to an average and to the range.

Give any averages to 1 decimal place.

$$\text{mean Team A} = 107 \div 8 = 13.4$$

$$\text{mean Team B} = 134 \div 8 = 16.8$$

$$\text{range Team A} = 23 - 8 = 15$$

$$\text{range Team B} = 20 - 12 = 8$$

compare the means and the ranges in words

On average Team B did better than Team A (mean 16.8 compared with 13.4). Team B was more consistent because the range 8 is smaller than 15.

3 / 3

- 47 The table shows information about the mass, m kg, of parcels.

(a) Write down the modal class.

(b) Write down the class that contains the median.

(c) Work out an estimate for the mean.

Class	Frequency
$0 < m \leq 5$	6
$5 < m \leq 10$	14
$10 < m \leq 15$	2
$15 < m \leq 20$	2

(a) highest frequency is 14 so the modal class is $5 < m \leq 10$

(b) 24 values

median is the 12.5th value

cumulative frequencies reach it in $5 < m \leq 10$

(c) midpoints: 2.5, 7.5, 12.5, 17.5

$$2.5 \times 6 + 7.5 \times 14 + 12.5 \times 2 + 17.5 \times 2 = 180$$

$$180 \div 24 = 7.5$$

(a) $5 < m \leq 10$ (b) $5 < m \leq 10$

(c) 7.5

3 / 3

- 48 The table shows the number of goals scored by a team in each of some matches.

(a) Write down the mode.

(b) Work out the total number of values.

(c) Work out the median.

(d) Work out the mean.

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

(a) highest frequency 9: mode = 4

$$(b) 1 + 9 + 6 + 1 + 2 + 6 = 25$$

(c) median at position 13: 5

$$(d) 3 \times 1 + 4 \times 9 + 5 \times 6 + 6 \times 1 + 7 \times 2 + 8 \times 6 = 137$$

$$137 \div 25 = 5.48$$

(a) 4 (b) 25 (c) 5 (d) 5.48

3 / 3

- 49 Here are the points scored in 8 matches for Team A and for Team B.

Team A: 10, 16, 25, 20, 19, 10, 19, 11

Team B: 22, 17, 14, 20, 16, 19, 17, 16

Compare the distributions. You must refer to an average and to the range.

Give any averages to 1 decimal place.

$$\text{mean Team A} = 130 \div 8 = 16.3$$

$$\text{mean Team B} = 141 \div 8 = 17.6$$

$$\text{range Team A} = 25 - 10 = 15$$

$$\text{range Team B} = 22 - 14 = 8$$

compare the means and the ranges in words

On average Team B did better than Team A (mean 17.6 compared with 16.3). Team B was more consistent because the range 8 is smaller than 15.

3 / 3

- 50 Here are the points scored in 6 matches for Team A and for Team B.

Team A: 23, 13, 20, 22, 24, 25

Team B: 25, 14, 22, 8, 13, 12

Compare the distributions. You must refer to an average and to the range.

Give any averages to 1 decimal place.

$$\text{mean Team A} = 127 \div 6 = 21.2$$

$$\text{mean Team B} = 94 \div 6 = 15.7$$

$$\text{range Team A} = 25 - 13 = 12$$

$$\text{range Team B} = 25 - 8 = 17$$

compare the means and the ranges in words

On average Team A did better than Team B (mean 21.2 compared with 15.7). Team A was more consistent because the range 12 is smaller than 17.

3 / 3