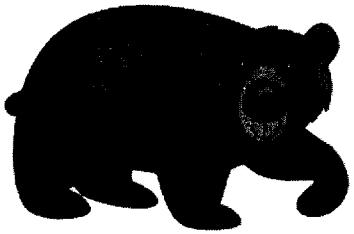
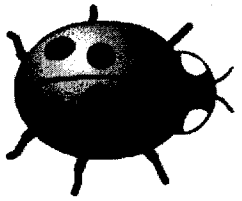
AVERAGES



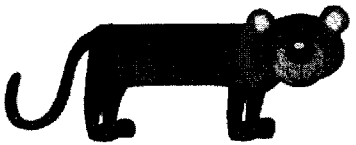
Animal Bear

Legs 4



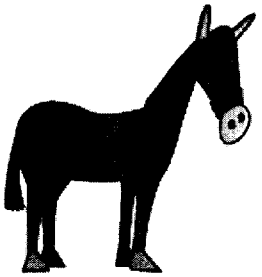
Animal Ladybird

Legs 6



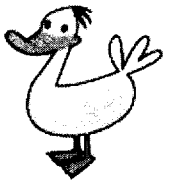
Animal Tiger

Legs 4



Animal horse

Legs 4



Animal duck

Legs 2

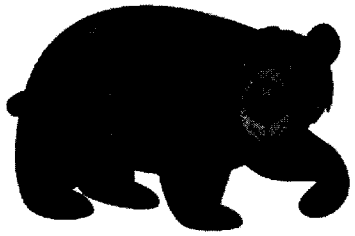
Mode 4 legs

Median 2, 4, 4, 4, 6 4 legs

Mean $\frac{2+4+4+4+6}{5} = \frac{20}{5} =$ 4 legs

Range $6-2 = 4$ legs

LEGS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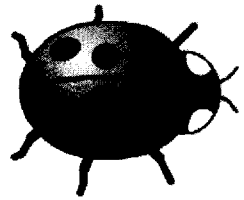
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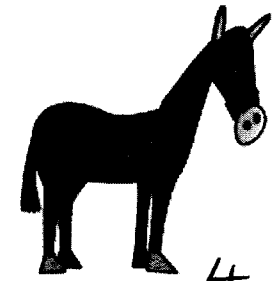
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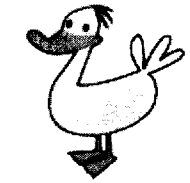
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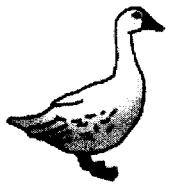
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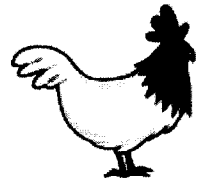
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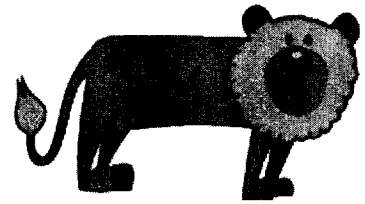
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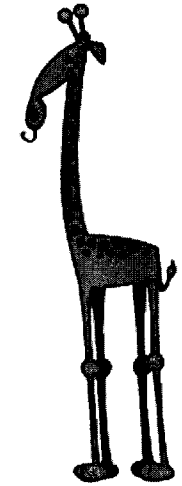
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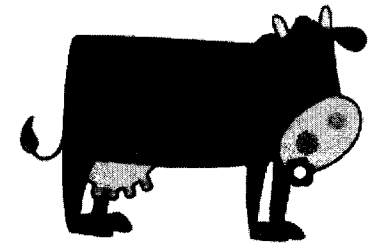
4

The data

Write down the number of legs each animals has

2, 2, 2, 4, 4, 4, 4, 4, 4, 6

Find

The mean

$\frac{36}{10} = 3.6$ legs

The mode

4 legs

The median

$\frac{4+4}{2} = 4$ legs

The range

$6 - 2 = 4$.

The data shows the age in years of a group of students and teachers within each school.

School A student total = 180 adult total = 187

students	7	7	7	8	8	8	9	9	10	10	10	10	11	11	11	11	11	11	11		
teachers	24	29	34	42	58																

19
5
24

School B student total = 250 adult total = 221

students	11	11	11	11	12	12	13	14	14	14	14	15	15	16	16	16	17	18	
teachers	26	29	31	38	44	53													

18
6
24.

1) Which school is a Primary School? A
2) Which school is a Secondary School? B
3) What is the age of the youngest student in School A? 7
4) What is the range of ages of students in School A? $11-7=4$
5) What is the range of ages of students in School B? $18-11=7$
6) What is the median age of the teachers in School A? 34
7) What is the median age of the teachers in School B? $\frac{31+38}{2} = \frac{69}{2} = 34.5$
8) Which school has the oldest teacher? A
9) What is the median age of the group from School A? $\frac{10+11}{2} = 10.5$
10) What is the median age of the group from School B? $\frac{15+15}{2} = 15$
11) What is the age of the youngest teacher in School B? 26
12) Calculate the mean age of the students $180+250=430$ $19+18=37$ $430 \div 37 = 11.6$

School A

	Mean	Mode	Median	Range
students	$\frac{180}{19}=9.5$	11	10	4
teachers	$\frac{187}{5}=37.4$	X	34	34
whole group	$\frac{367}{24}=15.3$	11	10.5	51

School B

	Mean	Mode	Median	Range
students	$\frac{250}{18}=13.9$	11 and 14	14	7
teachers	$\frac{221}{6}=36.8$	X	34.5	27
whole group	$\frac{471}{24}=19.6$	11 and 14	15	42

Mean, Median, Mode and Range

Find the mean, median, mode and range of these sets of numbers.

1) 4 6 8 8 10 Mean = 36 ÷ 5 = 7·2 Med = 8 Mode = 8 Rag = 6

2) 3 2 1 3 3 Mean = 12 ÷ 5 = 2·4 Med = 3 Mode = 3 R = 2

3) 7 6 7 2 3 1 9 Mean = 35 ÷ 7 = 5 Med = 6 Mode = 7 R = 8

4) 6 6 9 Mean = 21 ÷ 3 = 7 Med = 6 Mode = 6 R = 2

5) 5 6 5 4 Mean = 20 ÷ 4 = 5 Med = 5 Mode = 5 R = 2

6) 6 7 7 7 2 1 Mean = 30 ÷ 6 = 5 Med = 6·5 Mode = 7 R = 6

7) This table shows how many TVs people have in their homes. Find the mean, median, mode and range from this table.

Number of TVs	Frequency	
1	3	1×3 = 3
2	4	2×4 = 8
3	2	3×2 = 6
4	1	4×1 = 4
	10	21

Mean = $\frac{21}{10}$ = 2·1 Median = 2 Mode = 2 range (TVs) 4 − 1 = 3

8) Sally took 5 tests. She scored 45%, 23%, 87%, 62% and 74%.

a) Find the range of Sally's marks. 87 − 23 = 64%.

b) Find her median mark. 62%

c) Find her mean mark. 291 ÷ 5 = 58·2%

9) Brian took 4 tests. He scored 63%, 58%, 71% and 42%.

a) Find the range of Brian's marks. 71 − 42 = 29%.

b) Find his median mark. $\frac{58+63}{2}$ = $\frac{121}{2}$ = 60·5%.

c) Find his mean mark. 234 ÷ 4 = 58·5%.

10) Use your answers to questions 8 and 9 to answer these questions.

a) Who did better in the tests Brian or Sally? Brian, he had a higher mean.

b) What do their ranges tell you about their test marks?

Brian is more consistent, he has a smaller range.

Averages from a frequency table

1)

Pens	Frequency	P x F	frequency running total
0	4	0×4 = 0	4
1	6	1×6 = 6	4+6 = 10
2	7	2×7 = 14	4+6+7 = 17
3	5	3×5 = 15	4+6+7+5 = 22
4	2	4×2 = 8	4+6+7+5+2 = 24
5	1	5×1 = 5	25
	25	48	

Find the mean $48 \div 25 = 1.92$

Find the mode 2 pens

How many pieces of data 25 (number of pieces data + 1) ÷ 2 = $\frac{25+1}{2} = 13$

Find the median 13th piece of data is a 2

Find the range $5 - 0 = 5$

2)

Goals	Frequency	G x F	frequency running total
0	7	0	7
1	5	5	12
2	3	6	15
3	6	18	21
4	2	8	23
5	1	5	24
6	1	5	25
	25	47	

Find the mean $47 \div 25 = 1.88$

Find the mode 0

How many pieces of data 25 (number of pieces data + 1) ÷ 2 = $\frac{25+1}{2} = 13$

Find the median 2

Find the range $6 - 0 = 6$

A survey of the length of leaves in a garden

length of leaf in cm	Frequency	midpoint	frequency x midpoint	frequency running total
$0 \leq L < 5$	4	2·5	10	4
$5 \leq L < 10$	5	7·5	37·5	9
$10 \leq L < 15$	6	12·5	75	15
$15 \leq L < 20$	2	17·5	35	17
$20 \leq L < 25$	5	22·5	112·5	22
	22		270	

in a garden was collected. The measurements are in cm

14.2	11.8	21.2	24.0	8.6	6.2	5.7	5.6	5.0	13.9	1.2
10.9	19.0	20.0	4.6	2.6	23.0	1.5	10.0	22.3	11.0	18.4

Complete the frequency section of the table

What is the modal group? $10 \leq L < 15$

Find an estimate of the mean $270 \div 22 = 12{\cdot}3\text{ cm}$

Which group contains the median? $\frac{11^{th} + 12^{th}}{2}$

11^{th} and 12^{th} both in the grap $10 \leq L < 15$

Averages review

A set of numbers

2, 7, 8, 7, 3

mean $27 \div 5 = 5.4$
median 7
mode 7
range $8 - 2 = 6$

2, 5, 5, 3, 5, 4

mean $24 \div 6 = 4$
median $\frac{3+4}{2} = 3.5$
mode 5
range $5 - 2 = 3$

A frequency table

pets	frequency	
0	3	0
1	6	6
2	5	10
3	3	9
4	1	4
	18	29

mean $29 \div 18 = 1.6$
median $\frac{1+2}{2} = 1.5$
mode 1
range $4 - 0 = 4$

A grouped frequency table

height	frequency	midpoint	mid x freq
$0 \le h < 10$	4	5	20
$10 \le h < 20$	7	15	105
$20 \le h < 30$	6	25	150
$30 \le h < 40$	2	35	70
$40 \le h < 50$	1	45	45
	20		390

estimate of the mean $390 \div 20 = 19.5$
modial group $10 \le h < 20$
group containing the median $10 \le h < 20$

Adding an extra piece of data

John has taken 4 tests, his mean score so far is 7 out of 10. In his 5th test he scored 2 out of 10. What is his mean score now?

Find the total of John's 4 tests. $4 \times 7 = 28$ Add the 5th score $28 + 2 = 30$ Mean $= \frac{30}{5} = 6$

Is the answer sensible?

TVs	Frequency
1	2
2	5
3	2

This survey shows the number of TVs per house.
Sally calcualted that the mean number of TVs per house is 6.

Is this sensible? No the mean must be between 1 and 3, the least and most number of TVs

Is it sensible to use the mean?

These are the ages of a group of students and their teacher. 11, 12, 11, 12, 11, 12, 12, 11, 12, 45
Is the mean a good average to use (explain yor answer)? No, because of the teacher.
Which average would be better in this example? median.