Reversing the Mean

Sometimes when working with averages, you are told the value of the mean and expected to use this to solve problems.

Remember

$$\textbf{Mean} = \textbf{Total} \div \textbf{Count}$$

or

$$\textbf{Mean} = \frac{Total}{Count}$$

This can be rearranged to give

$$\textbf{Total} = \text{Mean} \times \text{Count}.$$

Remembering this will allow you to answer B grade averages questions such as:

1. Three girls have a mean age of 15. Sheila joins the group and the mean age is now 16. How old is Sheila?

For three girls, total age = $15 \times 3 = 45$ years

For four girls, total age = $16 \times 4 = 64$ years.

So Sheila is $64 - 45 = 19$ years old

2. Class A and Class B have 20 and 30 students respectively. The mean maths mark of Class A was 68 and the mean of Class B was 75. What was the mean mark across the two classes?

For CLASS A, total marks = $68 \times 20 = 1360$

For CLASS B, total marks = $75 \times 30 = 2250$ +

Total marks for both classes = 3610

Mean = $3610 \div 50 = 72.2$

3. The mean age of 10 boys and 20 girls is 16. If the mean age of the boys is 17, what is the mean age of the girls?

Total Age of boys = $17 \times 10 = 170$

Total Age of boys & girls = $16 \times 30 = 480$

So total age of girls = $480 - 170 = 310$

So mean age of girls = $310 \div 20 = 15.5$

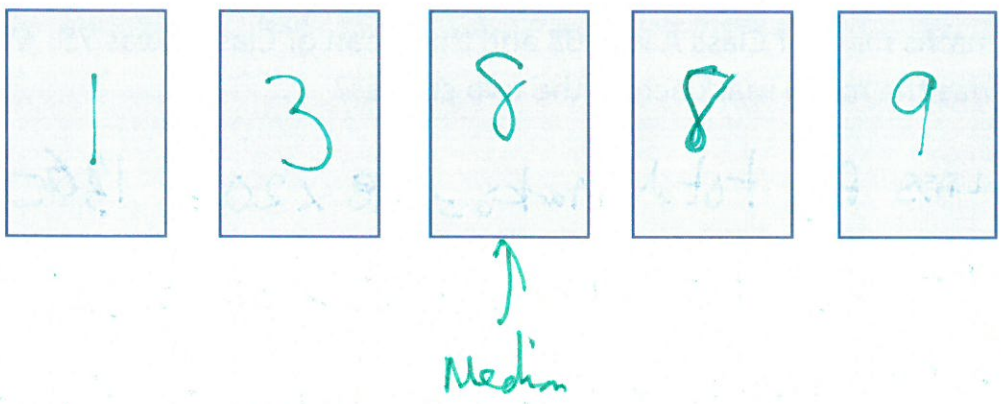
4. Write down five numbers so that the median is 8, the mode is 8 and the range is 8 and the mean is 5.8.

Median = 8, so middle is 8

Most Mode 8

Range = 8

Total = $5.8 \times 5 = 29$



5. In April the mean rainfall in Tenby was 65mm. During the first seven days the mean rainfall was 120mm. Calculate the mean rainfall for the rest of the month. What do these values tell you about the weather pattern in Tenby in April?

30 days in April

Total rain in first 7 days = $120 \times 7 = 840$mm

Total rain in whole month = $65 \times 30 = 1950$mm

So total rainfall in rest of month = $1950 - 840$
$= 1110$mm

So Mean rainfall in remaing 23 days = $\frac{1110}{23} = 48.3$mm

This tells us that Tenby had a very wet start to the month but then got drier

Reverse Mean Intermediate/Higher GCSE Questions

1) Pete has seven Shetland ponies. They have a mean height of 116cm.
Pete buys an eighth pony. The height of this pony is 128cm.
Find the mean height of all eight ponies.

Total height of 7 ponies = $7 \times 116 = 812$cm

With extra ponie, total height of 8 ponies = $812 + 128$
$= 940$cm

So mean height of 8 ponies = $940 \div 8 = 117.5$cm

2) The mean height of seven pupils is 123cm. One pupil of height 147cm leaves the group.
Find the mean height of the remaining six pupils

Total height of 7 pupils = $123 \times 7 = 861$cm

Total height after one leaves = $861 - 147 = 714$cm

So mean height of remaining 6 = $714 \div 6 = 119$cm

3) There are 12 students in Phil's Maths group. The mean mark in a test is 76%.
In Paul's group there are only eight students. Their mean mark is 84%.
Find the overall mean for the 20 children.

Total Mark of Phil's class = $12 \times 76 = 912$

Total mark of Paul's class = $8 \times 84 = 672$

So total mark of both classes = $912 + 672$
$= 1584$

So Mean Mark of 20 children = $1584 \div 20$
$= 79.2$

4) Don delivers pint bottles of milk to two streets. For the first street of 10 houses, the mean number of bottles of milk he delivers is 3.1.
For the second street of six houses, the mean number of bottles he delivers is 2.5.
Find the mean number of bottles of milk he delivers per household for the two streets altogether.

Total bottles on first street = $10 \times 3.1 = 31$ bottles

Total bottles on second street = $6 \times 2.5 = 15$ bottles.

So total bottles on both streets = $31 + 15 = 46$ bottles

Mean bottles for 16 houses = $46 \div 16 = 2.9$ bottles

5) Nigel has scored a mean of 18 runs in the last five cricket matches. His mean score must be 20 or more for him to be chosen for the school team.
Find the number of runs that he must make in the next match if he is to be chosen for the school team.

Total runs in 5 matches = 5x18 = 90 runs

For his mean score over 6 matches needs to be at least 20,

Total runs for 6 matches must be 6x20 = 120

So in this game he must score at least 120-90 = 30 run

6) Annabel recorded her test results in the back of her exercise book.

Maths	English	Physics	Chemistry	Biology
88%	85%	77%	79%	

Annabel knows the mean of her five tests was 81%.
What did she get in Biology?

Total of 5 tests = 5x81 = 405

Total without Biology = 88+85+77+79 = 329

So in Biology she scored 405-329 = 76%

Numerical Answers: (1) 117.5cm (2) 119cm (3) 79.2% (4) 2.9 bottles (5) 30 runs (6) 76%