

## Y8 Maths Knowledge Organiser Topic 2: Rounding and estimating

<p><b>What must I be able to do?</b></p> <p>You may need to revise the following:</p> <ul style="list-style-type: none"> <li>• <a href="#">Year 7 Topic 3 Place value and rounding</a></li> </ul> <p><b>New content:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Round any number to a required number of significant figures             <ul style="list-style-type: none"> <li>➤ Sparx M994, M131</li> </ul> </li> <li><input type="checkbox"/> Use rounding to significant figures to estimate calculations             <ul style="list-style-type: none"> <li>➤ Sparx M878</li> </ul> </li> <li><input type="checkbox"/> Use a calculation to work out other calculations</li> </ul>	<p><b>Key vocabulary</b></p> <p><b>Significant figures</b>    The digits of a number that carry meaningful contributions to its size. The most significant figure is the first digit which is not a 0 when reading from left to right. This is usually referred to as 1 significant figure or 1 s.f.</p>
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### Rounding to significant figures

The first significant figure (1.s.f) is the first digit in a number which is not a 0. It is the digit with the most value.

E.g. the 1<sup>st</sup> s.f. is underlined in each of these numbers:  
 $345\underset{\cdot}{6}$      $\underset{\cdot}{6}7$      $0.\underset{\cdot}{4}03$

To round to 1.s.f you need to identify which place value column that digit is in and round to that accuracy

e.g. When rounded to 1 significant figure:

- $345\underset{\cdot}{6}$  becomes 3000 as the 1<sup>st</sup> s.f. is in the thousands so we round to the nearest thousand.
- $\underset{\cdot}{6}7$  becomes 70 as the 1<sup>st</sup> s.f. is in the tens so we round to the nearest ten.
- $0.\underset{\cdot}{4}03$  becomes 0.4 as the 1<sup>st</sup> s.f. is the tenths so we round to the nearest tenth (the same as to 1.d.p.)

The second significant figure is just the next digit after the first significant figure. This can be a 0.

e.g. When rounded to 2 significant figures:

- $345\underset{\cdot}{6}$  becomes 3500 as the 2<sup>nd</sup> s.f. (the 4) is in the hundreds so we round to the nearest hundred.
- $\underset{\cdot}{6}7$  remains as  $\underset{\cdot}{6}7$  as the 2<sup>nd</sup> s.f. (the 7) is in the ones so we round to the nearest integer.
- $0.\underset{\cdot}{4}03$  becomes 0.41 as the 2<sup>nd</sup> s.f. (the 0) is in the hundredths so we round to the nearest hundredth (the same as to 2.d.p.).

### Use rounding to estimate calculations

This is the same idea as with estimation in Year 7 but you will see more questions involving division by decimals.

e.g. Estimate the following:

a)  $\frac{4215 \times 82}{0.487}$

You need to round to a sensible number of significant figures to ensure that you can work out the answer.

In this case, 4215 to 1.s.f. is 4000

82 to 1.s.f is 80 and 0.487 to 1.s.f is 0.5

Therefore our estimation becomes  $\frac{4000 \times 80}{0.5}$

$4000 \times 80 = 320000$  so we get  $\frac{320000}{0.5} = 640000$

Dividing by  $\frac{1}{2}$  is the same as multiplying by 2  
(Year 7 Unit 7)

While 1.s.f. is often good enough, it won't always work.

e.g Estimate  $\sqrt{321 \times 18}$

$= \sqrt{320 \times 20} = \sqrt{6400} = 80$

Here we choose 2.s.f for 321 as this allows us to aim for the square number 6400 (64 x 100 - both are square numbers). It would not have worked with 321 to 1.s.f. as  $300 \times 20$  is 6000 and 60 is not square.

### Using a calculation to find others

You will be given a calculation with the answer and need to use this to write the answer to other calculations. The idea is to do it without needing to fully work out the answer from scratch.

e.g. Given that  $85 \times 2843 = 241655$  write down the answer to

a)  $85 \times 28.43$

$28.43$  is  $2843 \div 100$

So this is  $85 \times 2843 \div 100 = 241655 \div 100$

$= 2416.55$

b)  $850 \times 284.3$

850 is  $85 \times 10$  and  $284.3$  is  $2843 \div 10$

So this is  $85 \times 2843 \times 10 \div 10 = 241655 \times 10 \div 10$

$= 241655$

Look for what has changed and how it has changed

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These questions nearly always involve the original values being multiplied or divided by powers of 10.