N1 Calculations and Accuracy – Y10 Heptagon

Knowledge Organiser

Keywords

Estimate – to find a value close enough to the correct value using rounding in the calculation

Rounding – make a number simpler but keep it close to its actual value

eg 74 rounded to the nearest 10 is 70

Significant figures (SF) – these are the digits within a number that we round to, we count significant figures from the left of a number. We use zeros to show the size of the number.

Rounding to SF Examples

Round 1346 to 2 sf, counting from the left the 2nd SF is the 3

So it rounds to either 1300 or 1400

1346 is closer to 1300 so = 1300

Round 4.67 to 1 sf, counting from the left the 1st SF is the 4

So it rounds to either 4 or 5

4.67 is closer to 5 so = 5

Estimation Examples

To ESTIMATE you round each number off to **1 significant figure** and then work out the calculation with the rounded values.

EG Work out an estimate for

$$\frac{203 \times 9.93}{0.511}$$

$$\approx \frac{200 \times 10}{0.5}$$

$$= \frac{2000}{0.5}$$

$$= 4000$$

EG Use approximations to estimate the value of

$$\frac{4.02^2 + \sqrt{102}}{0.51}$$

$$\approx \frac{4^2 + \sqrt{100}}{0.5}$$

$$= \frac{16 + 10}{0.5}$$

$$= \frac{26}{0.5}$$

$$= 52$$

Bounds Examples

Lower bound – the smallest value that a given measurement could be given the accuracy it has been rounded to

Upper bound –the value at which a rounded number would round up, given the accuracy it has been rounded to

Error interval – an inequality showing the lower and upper bounds of a rounded measurement

To find lower and upper bounds

- Identify the level of accuracy it has been rounded to
- Find half that value
- Add it on to find the upper bound
- Subtract to find the lower bound

EXAMPLES:

Error Intervals

A number, n, is rounded to 1 decimal place.

The result is 6.7

Write the error interval for n.

0.1 ÷ 2 = 0.05 so UB = 6.7+ 0.5 = 6.75 , LB = 6.7 – 0.5 = 6.65

6.65 ≤ n < 6.75

A number, d, is rounded to the nearest 50.

The result is 8350

Write the error interval for d.

50 ÷ 2 = 25 so

UB = 8350 + 25 = 8375

LB = 8350 – 25 = 8325

8325 ≤ d < 8375

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