

# Knowledge Organiser – U5 - Accuracy and Estimation

Decimal Place Value Chart

|                   |               |           |          |      |      |               |                 |                 |                   |                    |                     |
|-------------------|---------------|-----------|----------|------|------|---------------|-----------------|-----------------|-------------------|--------------------|---------------------|
| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones | .             | tenths          | hundredths      | thousandths       | ten thousandths    | hundred thousandths |
| HTH               | TTh           | Th        | H        | T    | O    | .             | t               | h               | th                | tth                | hth                 |
| 100,000           | 10,000        | 1,000     | 100      | 10   | 1    | .             | $\frac{1}{10}$  | $\frac{1}{100}$ | $\frac{1}{1,000}$ | $\frac{1}{10,000}$ | $\frac{1}{100,000}$ |
| Whole Number Part |               |           |          |      |      | Decimal Point | Fractional Part |                 |                   |                    |                     |

## Rounding R

2.46192 (to 12dp) - Is this closer to 2.46 or 2.47

2.46

2.47

2.46 | 192

This shows the number is closer to 2.46

## Significant Figures

370 to 1 significant figure is 400

37 to 1 significant figure is 40

3.7 to 1 significant figure is 4

0.37 to 1 significant figure is 0.4

0.00000037 to 1 significant figure is 0.0000004

SF: Round to the first nonzero number

≈ means 'approximately equal to'

To estimate is to find something **close to the correct answer**.

An estimate for the height of a man is 1.8 metres.

An estimate for the height of a door is 2 metres.

4.83 to one decimal place = 4.8

0.567 to two decimal places = 0.57

1.9998 to three decimal places = 2.000

## Estimation R

Round to 1 significant figure to estimate

$$21.4 \times 3.1 \approx 20 \times 3 \approx 60$$

The equal sign changes to show it is an estimation

This is an **underestimate** because both values were rounded down

It is good to check all calculations with an estimate in all aspects of maths – it helps you identify calculation errors.

### EXAMPLES:

|              | to 3 s.f. | to 2 s.f. | to 1 s.f. |
|--------------|-----------|-----------|-----------|
| 1) 54.7651   | 54.8      | 55        | 50        |
| 2) 0.0045902 | 0.00459   | 0.0046    | 0.005     |
| 3) 30895.4   | 30900     | 31000     | 30000     |

$$\frac{348 + 692}{0.526} \approx \frac{300 + 700}{0.5} = 2000$$

'Note that dividing by 0.5 is the same as multiplying by 2'

Work out an estimate for the value of  $\frac{91.25 \times 4.87}{2.31}$

## Limits of accuracy

A width  $w$  has been rounded to 6.4cm correct to 1dp.

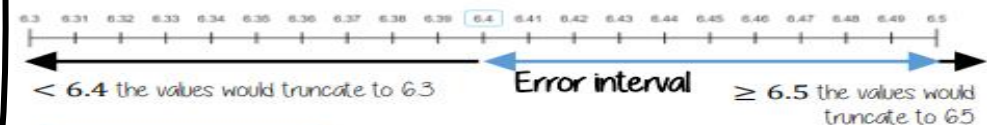


The error interval

$$6.35 \leq w < 6.45$$

One value within these limits would round to 6.4 to 1dp

A width  $w$  has been truncated to 6.4cm correct to 1dp.



$$6.4 \leq w < 6.5$$

Any value within these limits would **truncate** to 6.4 to 1dp

### Special case:

Round 23.999 to 2d.p. = 24.00

As the 3rd 9 rounds up the 2nd 9 which rounds up the 1st 9 due to the 9 turning into a '10' and insert zeros.

## Key Words

Estimate

Round

Significant figures

Decimal places

Consecutive

Hegarty Maths

17,56,130,131,

774 & 775