Key Vocabulary

Approximate	A rough value or to find a rough answer.
Round	To give a value "to the nearest …" E.g. 18 to the nearest 10 is 20.
Decimal place	A digit after the decimal point. The first decimal place is the first digit after the decimal point.
Check	Verify that an answer is correct or of the right size.
Significant figure	A figure (digit/ number) is significant if it tells you something about the value of an answer. Zeroes at the start or end of a number are not significant. Significant figure is often abbreviated to sig fig or s.f.
Operation	Something that can be done to a number. The four basic operations are +. -, x, ÷.
Inverse	An operation that does the opposite of another, e.g. the inverse of + is -.
Order of Magnitude	An indication of the largest element of a value, e.g. the biggest part of 2,407,984 is two million. The order of magnitude of this number is millions.
≈	This symbol is like an "=" but means "is roughly equal to".

Key facts / Diagrams

0.00613

Zeroes at the start are **NOT** significant

45,600,000

Zeroes at the end are **NOT** significant

203.056

Zeroes in the middle **ARE** significant

In 407,560	5 is the fourth significant figure
In 407,560	0 is the second significant figure
In 0.003204	3 is the first significant figure
In 0.003204	4 is the fourth significant figure
In 0.2608	2 is in the first decimal place
In 0.2608	0 is in the third decimal place

When rounding look at the "next digit" along.
If it is 0, 1, 2, 3, or 4 the number stays as it is.
If it is 5, 6, 7, 8, or 9 the number rounds up.
Always round from the original number.

The usual approach to estimating is to round each number in the sum to 1 sig fig and then do the calculation. This will give an approximate solution. When dividing or square rooting we might choose to round to a nearby number that we know works.

Common misconceptions

- When answering multiple rounding questions, sometimes people use a previous answer to get the next answer.
- 0.449 to 2 dec pl = 0.45. This number rounded to 1 dec pl = 0.5, BUT 0.449 rounded to one decimal place = 0.4 because the next digit is a 4.
- Don't forget that zeroes after the first digit, but before the last digit **ARE** significant.

Worked examples

Round 24,503 to 2 sig fig. 4 is the second sig fig, so check the next digit. 5 tells us to "round up" to 25,000.
Round 0.56298 to two decimal places. 6 is the second decimal place, so check the next digit. 2 means the number stays the same ("rounds down") and so it is 0.56.

Estimate 463 x 193. 500 x 200 = 100,000
Estimate 590,000 ÷ 2984. 600,000 ÷ 3,000.
This simplifies as follows 600,000 ÷ 3,000 = 60,000 ÷ 300 = 6,000 ÷ 30 = 600 ÷ 3 = 200
Estimate 38.97 ÷ 0.0513 = 40 ÷ 0.05 = 400 ÷ 0.5 = 4,000 ÷ 5 = 800
Estimate 421,960 ÷ 6.954 ≈ 420,000 ÷ 7 = 60,000
Careful with rounding.
0.99999 to 2 dec pl = 1.00
0.90245 to 2 sig fig = 0.90