

Round to a Given Number of Significant Figures (s.f.) – NA6

Example

Round 3.141692654 to 1 s.f.

3.141692654

ignore these!

Solution

The number after the required significant figure is 1.

So round down.

Round down by ignoring numbers after 3.

So this becomes just 3 to 1 s.f.!!

1 s.f. just means the first digit which isn't a zero, i.e. in this case 3.

Example

Round 3.141692654 to 5 s.f.

3.141692654

Solution

This is the 5th significant figure.

The number after this is 9.

This is '5 or higher' so round up.

Round up by increasing this by one.

So this becomes 3.1417 to 5 s.f.!!

$$6 + 1 = 7$$

Strategy

Look at the number after the required significant figure. Round up if this number is 5 or higher. Round down if this number is 4 or below. Round down by ignoring numbers after the required significant figure. Round up by rounding the required significant figure up by one digit and ignore numbers thereafter.

Your Turn!!

Round 3.140692654 to a) 2 s.f. b) 3 s.f. c) 4 s.f.

For SMALL numbers between 0 and 1 → Watch Out!!

Example

Round 0.34056 to 3 s.f.

Front noughts are not significant

0.34056

Solution

This is the 3rd significant figure.

The number after this is 5.

This is '5 and over' so round up.

Round up by increasing this by one.

So this becomes 0.341 to 3 s.f. !!

$$0 + 1 = 1$$

This is **not** a front nought so it is **significant**

This is a **front nought** so it is **not significant!**

Your Turn!!

d) Round 0.34056 to 2 s.f.

e) Round 0.0034056 to 4 s.f.

Hint: these noughts are **not significant**.

These ones still are **significant**

Extra notes on Estimation

In your examination you will be expected to round your answers as appropriate, often to 2 or 3 significant figures. Occasional examination questions will require you to estimate a simple numerical calculation. Normally this requires you to simply round the numbers to a convenient number and then calculate - often rounding to 1 significant figure is appropriate.

Example 1

Solution 1

$$\text{Estimate } \frac{20.04 + 5.4}{2.15} \approx \frac{20 + 5}{2} = \frac{25}{2} = 12.5$$

Example 2

Solution 2

$$\text{Estimate } \sqrt{2.05 \times 8.21 \times (3.9)^2} \approx \sqrt{2 \times 8 \times (4)^2} = \sqrt{16 \times 16} = 16$$

Note: \approx means approximately equals to

RAPID 'ACID' TEST – Blank out the page above before answering these!

Round the following to the number of significant figures in brackets.

1. 70.254 (2)

2. 70.254 (3)

3. 0.05454 (2)

4. 0.05454 (3)