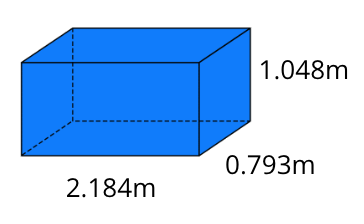
Worksheet 1: Measurement accuracy and rounding

WORKED EXAMPLE



Question 1

1. For the rectangular prism, find the volume using the measurements shown in the diagram.
2. For the rectangular prism, find the volume rounding the measurements to two decimal places.
3. Calculate the error in parts **a.** and **b.** (difference between the volume).

Error =

1. Express your answer to part **b.** as a percentage of the original volume found using the most accurate measurements.

% error =

Question 2

Repeat steps **b.**, **c. and** **d.** from **Question 1** using the original measurements rounded to one decimal place. Compare your answers.

2. Error =
3. % error

Question 3

Repeat steps **b.**, **c. and** **d.** from **Question 1** using the original measurements rounded to the nearest whole number. Compare your answers once again.

1. Error =

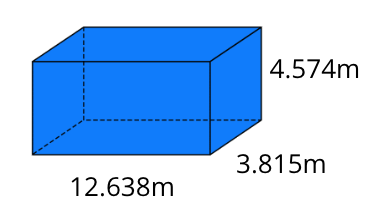
Differences are always expressed as a positive number .

1. % error

YOU TRY

Repeat the same process as in the worked example to answer the following question:

Will we get the biggest error when we round to two decimal places, one decimal place or to the nearest whole number?



1. **a.** Find the volume of the prism using the given measurements on the diagram.

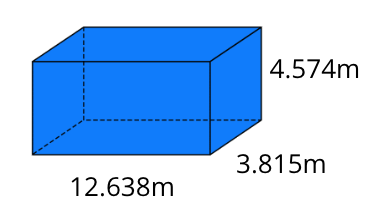
**b.** Find the volume of the prism rounding the measurements to two decimal places.

**c.** Calculate the error in parts **1.a.** and **1.b.** (difference between the volume).

**d.** Express your answer to **1.c.** as a percentage of the original volume found using the most accurate measurements.

1. Repeat parts **1.b.–d.** using the original measurements rounded to one decimal place.
2. Repeat parts **1.b.–d.** using the original measurements rounded to the nearest whole number.
3. Compare the three volumes resulting from questions **1**, **2** and **3**. Which method of rounding gives the biggest percentage error? Why? Will this always be the case?

YOU TRY – SOLUTIONS



1. **a.**

All the numbers are rounded to two decimal places e.g.



Take the difference and divide by the original volume. Multiply by 100 to turn this into the percentage error.

Error = =

The two calculations of volume are subtracted to find the error in . Always subtract the smaller number from the bigger so the answer is positive.

% error = **0.13%** (2 decimal places)

Error

% error =

1. Rounding to the nearest whole number because the numbers change significantly, for example, . You would expect this as the more you round a number the less accurate it becomes.