SIGNIFICANT DIGITS

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Rule #1:

All non-zero numbers are significant

Ex. 5489.213 → 7 significant digits

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Rule #2:

All zeros located between non-zero numbers are significant

Ex. 0.08006 → 4 significant digits

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Rule #3:

Zeros located to the left of a value are not significant

Ex. 0.00004 → 1 significant digit

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Rule #4:

Zeros that are located to the right of a value may or may not be significant

Ex. 1000.mL

4 significant digits

Ex. 1000mL

1 significant digit

SIGNIFICANT DIGITS

Ex. 1000mL → 1 significant digit

Why?

1000mL could have been anything from 951mL to 1049mL

SIGNIFICANT DIGITS

Ex. 1000.0mL → 5 significant digits

Why?

Rule #5
Any 0's to the right of a decimal that are not followed by any number are significant

CALCULATIONS WITH SIGNIFICANT DIGITS

Rule #1: Multiplying and Dividing

1.008 x 4.67

This value has the lowest number of significant digits

= 4.70736

= 4.71

The value with the lowest number of significant digits determines how many significant digits will appear in the answer

CALCULATIONS WITH SIGNIFICANT DIGITS

Rule #2: Adding and Subtracting

1.008 + 4.67

This value has the lowest number of **decimal** places

= 5.678

= 5.68

The value with the lowest number of **decimal places** determines how many decimal places will appear in the answer

CALCULATIONS WITH SIGNIFICANT DIGITS

Rule #3: Rounding

If greater than 5, round up

If less than 5, round down

CALCULATIONS WITH SIGNIFICANT DIGITS

Rule #3: Rounding

If 5, then...

...Round up if the preceding number is odd

Ex. 18.35 → 18.4

Odd number

CALCULATIONS WITH SIGNIFICANT DIGITS

Rule #3: Rounding

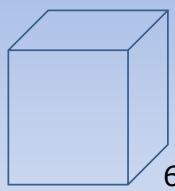
If 5, then...

...Round down if the preceding number is even

Ex. 18.25 → 18.2

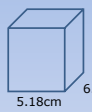
Even number

CALCULATIONS WITH SIGNIFICANT DIGITS



Calculate the volume of the rectangular prism

CALCULATIONS WITH SIGNIFICANT DIGITS



"12" has the lowest number of significant digits. So the answer must have 2 significant digits.

$V = l \times w \times h$

$= (5.18\text{cm}) \times (6.782\text{cm}) \times (12\text{cm})$

$= 421.56912\text{cm}^3$

$= 4.2 \times 10^2\text{cm}^3$

SIGNIFICANT DIGITS

Practice: *How many significant digits are in the following values?*

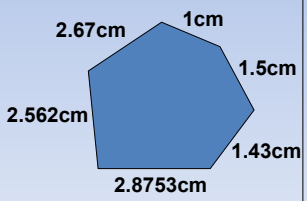
a) 5.703
b) 70
c) 100.
d) 395830
e) 0.0101
f) 21.0

Practice: *Round the following numbers to 2 significant digits*

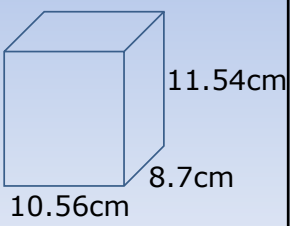
a) 1.01
b) 24.5
c) 17.5
d) 25.6
e) 48665
f) 11.5

SIGNIFICANT DIGITS

Practice: *Calculate the perimeter of the following shape*



Practice: *Calculate the volume of the following rectangular prism*



SIGNIFICANT DIGITS

Practice: *How many significant digits are in the following values?*

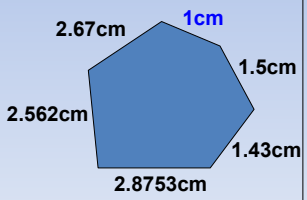
a) 5.703 4
b) 70 1
c) 100. 3
d) 395830 5
e) 0.0101 3
f) 21.0 3

Practice: *Round the following numbers to 2 significant digits*

a) 1.01 1.0
b) 24.5 24
c) 17.5 18
d) 25.6 26
e) 48665 4.9×10^4
f) 11.5 12

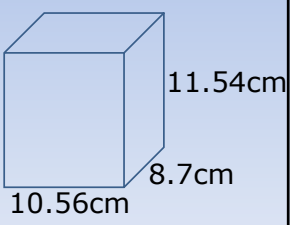
SIGNIFICANT DIGITS

Practice: *Calculate the perimeter of the following shape*



= 12.0373cm
= 12cm

Practice: *Calculate the volume of the following rectangular prism*



$= 1060.20288\text{cm}^3$
$= 1.1 \times 10^3\text{cm}^3$