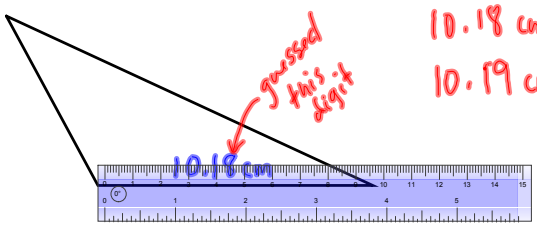
# Significant Digits

10.17 cm ?
10.18 cm ?
10.19 cm ?




10.18 cm
Certain ↑ uncertain digit

When counting significant digits, you count all the certain digits and the one uncertain digit.

* There can only be one uncertain digit

Basic Skill:

17. 2.9910 m => 5 sd
certain ↑ uncertain

19. 0.006 70 kg => 3 sd
leading zeroes don't count
certain ↑ uncertain
$6.70 \times 10^{-3}$ kg

20. 809 g => 3 sd

18. 5600 km => Is this 2 sd? 3 sd? 4 sd?
↑ ↑ ↑
? ? ?
ambiguous
Depends on the preciseness of the measuring instrument

4 sd => $5.600 \times 10^{3}$ km
3 sd => $5.60 \times 10^{3}$ km
2 sd => $5.6 \times 10^{3}$ km

Some older books use: 5600. for 4 sd
$5600$ for 4 sd

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# Addition and Subtraction

$32.14\ g + 124\ g + 0.025\ g$

$$\begin{array}{rl} & 32.14\ g \quad (4\text{sd}) \\ & 124\ \ g \quad (3\text{sd}) \\ + & 0.025\ g \quad (2\text{sd}) \\ \hline & 156.165\ g \end{array}$$

Round to the least precise place value

156 g

can only have one uncertain digit

# Multiplication & Division

42.14 m x 1.2 m

$$\begin{array}{r} 42.14\,\text{m} \\ \times \quad 1.2\,\text{m} \\ \hline 8428 \\ 4214 \\ \hline 50.568\ \text{m}^2 \end{array}$$

(4 sd)

(2 sd)

$51\ \text{m}^2$

2 sd

Round the final answer to the least number of sig. dig. used

One uncertain digit

21. $\frac{2.674\ m}{2.0\ m} = 1.337$

4 sd

2 sd

$\doteq 1.3$ ← 2 sd

22. $5.25\ L \times 1.3\ L = 6.825\ L^2$

3 sd 2 sd

$\doteq 6.8\ L^2$

what if:

$5.25\ L \times 1.30\ L = 6.825\ L^2$

$\doteq$ ~~$6.83\ L^2$~~

$\doteq 6.82\ L^2$ round to the even number

$6.835\ L^2 \Rightarrow 6.84$

23. $9.0\ cm + 7.66\ cm + 5.44\ cm \doteq 22.10\ cm$

$= 22.1\ cm$

↑ least precise place value

24. $10.07\ g - 3.1\ g = 6.97\ g$

$\doteq 7.0\ g$

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