Significant Digits

Consider the "Bounce That Ball" lab and someone records a bounce height of:

~~35.37291~~5 cm

↑ way too precise for the metre stick we used

if using mm markings

in theory 35.23 cm

in reality 35 cm

↑ certain digits ↑ uncertain digit (guess about)

(can only have 1 uncertain digit)

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

17. 2.9910 m → 5 sd

certain uncertain

19. 0.00670 kg → 3sd

certain uncertain

leading zeros don't count

zeroes count if after a non-zero digit after the decimal.

20. 809 g → 3 sd

certain ↑ uncertain

zeroes b/w non-zero digits are significant.

21. 5600 km → 2 or 3 or 4

depends on the precision of the measuring instrument

5.6×10^3 km → 2sd

5.60×10^3 km → 3sd

5.600×10^3 km → 4sd

Calculations with Significant Digits

Adding + Subtracting

$$\begin{array}{rr} 13.259 & m \\ 151 & m \\ + \quad 2.4 & m \\ \hline 166.659 & m \end{array}$$

↑ can only have 1 uncertain digit

Round the final answer to the least precise place value.

167 m

23. $9.0\,cm + 7.66\,cm + 5.44\,cm = 22.10\,cm$

22.1 cm

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

7.0 g

Multiplying + Dividing

$$\begin{array}{rr} 12.41 & m \quad (4sd) \\ \times \quad 32 & m \quad (2sd) \\ \hline 2482 & \\ 3723 & \\ \hline 397.12 & m^2 \end{array}$$

Round your final answer to the least number of significant digits.

$4.0 \times 10^1\ m^2$ (2sd) better

$40\ m^2$ okish

21. $\frac{2.674\,m}{2.0\,m} = 1.337$ (2sd, 2sd)

≈ 1.3

22. $5.25\,L \times 1.3\,L = 6.825\,L^2$ (2sd)

$\approx 6.8\,L^2$

What if I needed to round 6.825 to 3sd?

6.825

6.84

round to:

6.82

↑ even #.

6.8250001