

SIGNIFICANT FIGURES (SF)

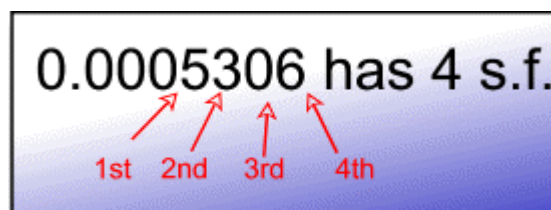
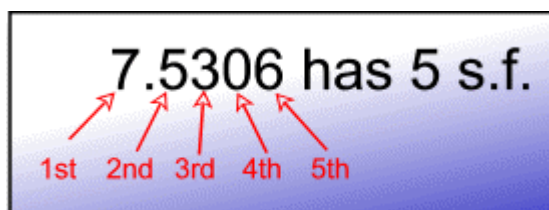
- Significant figures are used to give an approximate value for a number.

Examples

- If the exact number of people attending a football match was 3426, then an approximate number of people would be 3400.
- John has £12.76 in his pocket. This is approximately £13.
- To give a number correct to a certain number of significant figures, use the same rule as with decimal places:

If the next digit is 5 or more round up

- The 1st significant figure is the first non-zero digit. The 2nd, 3rd, 4th ... significant figures follow on after the 1st. They may or may not be zeros.



Examples

Number	to 3 s.f.	to 2 s.f.	to 1 s.f.
5.306	5.31	5.3	5
6745	6750	6700	7000
0.007851	0.00785	0.0079	0.008

- After rounding, make sure that you fill in any zeros necessary to **maintain the place value**:

Example

6745 to 2 s.f. = 6700, not 67.

ESTIMATION

- Estimation is a good way of checking answers, especially if using a calculator.
- Use the following tips when approximating:
 - Round the numbers to 'easier' numbers, usually 1 or 2 s.f.
 - Work out the estimate using these easier numbers.
 - Use the symbol \approx , which means approximately equal to.
 - For multiplying or dividing, never approximate a number with zero, use 0.1, 0.01 etc.
 - When adding or subtracting, very small numbers can be approximated to zero.
- Always try these questions, even if difficult, method marks can be obtained if you round to 1 or 2 s.f.

Examples

1. $9.89 \times 24.99 \approx 10 \times 25 = 250$
2. $(5.067)^2 \approx 5^2 = 25$
3. $0.09 \times 348 \approx 0.1 \times 350 = 35$
4. $\frac{545 \times 1.23}{11.65 \times 5.378} \approx \frac{550 \times 1}{11 \times 5} = \frac{550}{55} = 10$
5. Richard did this calculation on his calculator $\frac{8.6 \times 103}{2.9^2}$. He got 10.9.
 - a. Estimate the answer to the calculation without using a calculator.
 - b. Is Richard's answer the right **order of magnitude**?
(i.e. is it about the right size?)

Solution

- a. $\frac{8.6 \times 103}{2.9^2} \approx \frac{9 \times 100}{3^2} = \frac{900}{9} = 100$
- b. Richard's answer is not the right order of magnitude, it is 10 times too small.
6. $34.67 + 0.0004 \approx 35 + 0 = 35$
7. $\frac{11.9^3 \times 0.364}{392} \approx \frac{10^3 \times 0.4}{400} \approx \frac{1000 \times 0.4}{400} \approx \frac{400}{400} \approx 1$

SENSIBLE ANSWERS

- When solving problems, the answers should be rounded sensibly.
- Consider the context of the question.
- If the numbers in the question are given to 2 d.p., round your answer to 2 d.p.
- If the problem involves money, round to give a meaningful answer.

Examples

1. $8.98 \times 4.56 = 40.9488 = 40.95$ (2 d.p.)
2. Harry has £34.61. He divides it equally between 4 people. How much does each person get?

Solution

$$£34.61 \div 4 = £8.6525$$

Each person gets £8.65

3. Anna needs 32 litres of paint. Paint is sold in 5 litre tins. How many tins must she buy?

Answer

$$32 \div 5 = 6 \text{ remainder } 2$$

6 tins isn't enough so she must buy 7 tins.