Notes about Significant Figures:

The rules for deciding the number of significant figures are:

1. **Non-zero** digits are significant unless indicated otherwise (for instance see 8. below).
2. Zeros **between** two non-zero digits are significant.
3. Zeros **before** the first non-zero digit (i.e. "leading zeros") are **not** significant (for instance 0.003 has only one significant figure).
4. Zeros after the decimal point **and** after the first non-zero digit (i.e. "final zeros") are significant (for instance 3.200cm has four significant figures).
5. Zeros required before the decimal point are significant if the decimal point is shown (for instance 100.cm).
6. Zeros after the last non-zero digit when there is no decimal point may or may not be significant (for instance 1,200km). In such cases, you can make your own assumption of which figures you think are significant. You should indicate what assumption you have made. For instance, you might write: "1,200km (2 sig fig)" or "1,200km (4 sig fig)".
7. Include the **unit** of the measurement when expressing how well a value is known. (For example, the distance 32.56m is known to 0.01m).
8. To avoid round-off error, we encourage you to keep two insignificant figures in intermediate calculations and to show the significant figures with the designation "___|". For instance, a calculation that results in a mass that is only significant to a hundredth of a gram, could be written 103.00|52g.

The following rules apply to calculations with significant figures:

1. **Exact** physical and mathematical constants and defined conversion factors (π, 1 inch = 2.54cm, 1kg = 1000g) and integer coefficients (like the 2 in "$2\pi r$") have an **infinite** number of significant figures.
2. Sums and differences of values are known only as well as the least well known input value. For instance, 2.1km + 122m is known only to 0.1km or 100m. The resulting sum could be written in intermediate form as 2.1|22km or 2.1|22x10^{3}m. As another example: 5.462g – 5.43g = 0.03|2g (i.e. only one significant figure).
3. Products and quotients of values have the same number of significant figures as the input value with the least number of significant figures. For example, (2.45cm)(2.0cm) = 4.9|0cm^2 (i.e. two significant figures) or (3.244g)/(2.0cm^3) = 1.6|22g/cm^3 (i.e. 2 sig fig).
4. As mentioned in 8. above, to avoid round-off errors, carry up to **2 insignificant** figures in intermediate calculations until the end of the **final** calculation.
5. Insignificant figures (excess digits) are rounded off in the **final** step of the calculation(s).

Examples of Calculations with Significant Figures

15060.89g	This value is known to .01g
107.1 g	This value is known to .1g
+ 1200 g (assume 2 sig figs)	This value is known to 100g
163|67.99g	This value is known to 100g.

After rounding, there are **3 significant figures** in the final answer:

1.64x10^{4}g	This value is known to **1x10^{2}g**

(5.16m) × (31m) × (.009142m) = 1.4|62m^3 or **1.5m^3**

3 sig fig 2 s.f. 4 s.f. 2 s.f. **2 s.f. and the value is known to 0.1m^3**