Rules for significant figures

1. All non-zero integers are significant.

2. Zeros that occur **between** non-zero integers are significant. For example, the number: 302 has three significant figures.

3. Zeros that occur **after** the last non-zero integer and **after** the decimal point are significant when they are not place value holders. For example, the number: 1.000 has four significant figures.

4. Zeros that occur **after** the last non-zero integer and **before** the decimal point are not significant because they are just used as place value holders. For example, the number: 100 has one significant figure.

5. Zeros that occur **before** non-zero integers and **after** the decimal point are not significant because they are just used as a place value holders. For example, the number: 0.017 has two significant figures.

6. Zeros that occur **before** the first non-zero integer and **before** the decimal point are not significant because they are just place value holders. For example, the number: 00001.5 has two significant figures.

Some complications:

Numbers that result from **measurement** have limited precision. For example, when using a triple beam balance to determine the mass an object, there is a limit to the numbers of digits that you can precisely record. You may report the mass as 23.5 grams, but if the balance is unable to resolve mass in hundredth's of a gram then you may not report any more significant figures.

Exact numbers result from **counting**, not measuring. Exact numbers have an infinite number of significant figures. For example, if you have exactly 2 pencils, it is the same as saying you have 2.000000000 pencils (any number of zeros can follow the decimal point).

The result of a **calculation** may not have more significant figures than the least precise measurement. For example a calculator would produce the following result from this equation: $2.04 \times 3.1 = 6.324$. The result should be reported as 6.3 because 3.1 has only 2 significant figures. Be careful when you see all those digits on your calculator – they are not all significant.