

Week 3 Homework

1. Describe the difference between accuracy and precision
2. Explain the difference between random and systematic errors. Give an example of how you can reduce each error type. Which type of error is likely to reduce the accuracy of a result?
3. An experiment to calculate the resistance of a resistor gives a value of 3800Ω . The manufacturer states that the true value of the resistor is 3650Ω . Calculate the percentage difference between the experimental value and the true value.
4. A stopwatch measures time to an absolute uncertainty of $\pm 0.1\text{s}$. It is used to measure the time period of a pendulum's swing.
 - i) The time period for one complete swing is measured as 2s . Calculate the percentage uncertainty in the reading.
 - ii) The time period for ten complete swings is measured as 20s . Calculate the percentage uncertainty in the reading.
5. The mass of a sphere is $500 \text{ kg} \pm 20 \text{ kg}$. Its radius is $150 \text{ cm} \pm 5 \text{ cm}$. Calculate the percentage uncertainty in its density (volume of a sphere = $\frac{4}{3}\pi r^3$)