Scientists use, and create, many different kinds of equations to help them quantify their data, and make predictions.

A scientific theory describes how quantities ought to be logically related to each other, and provides a mathematical procedure for working with nature in a symbolic way.

Equations are used to extract information from data, and to model how qualities (speed, distance, temperature etc) are interrelated.

Equations help scientists extract information from basic data, and allow them to make predictions.

Here's how to do it!

If a pebble falls from the top of a building and takes 10.0 seconds to reach the ground, how high is the building? This equation predicts the distance of the fall (H) based on the time (T).

\[ H = \frac{1}{2} g T^2 \]

with \( T = 10.0 \) seconds:

\[ H = \frac{1}{2} \times 9.8 \times (10)^2 = 980 \text{ meters} \]

Now you try!

Evaluate the following equations for the indicated values of the variables:

1) \( d = d_0 + v_0 T + \frac{1}{2} a T^2 \) for \( a = 32 \), \( v_0 = 25.7 \), \( d_0 = 5.5 \) and \( T = 15.7 \)

2) \( E = mc^2 \) for \( m = 15 \) and \( c = 299,792.5 \)

3) \( L = 4\pi R^2 S T^4 \) for \( R = 6.9 \times 10^{10} \), \( S = 0.000058 \) and \( T = 5770.0 \)

4) \( M = 9.54 \times 10^{15} T m^3 \) for \( T = 3987.6 \) and \( m = 30.5 \)