Exponential and logarithmic functions and equations are used in many real life applications.

**Example 1:** Find out how long it will take to double your money if it is invested into an account that is compounded semiannually at 6% interest.

**Earthquakes:**

The magnitude of an earthquake is measured on a logarithmic scale. Charles Richter, a seismologist, created the Richter scale to measure relative sizes of earthquakes.

The Richter scale measures magnitude, \( R = \log I \), where \( I \) is the measure of intensity.

**Example 2:** How many times more intense is an earthquake that measures 7.8 on the Richter scale than one that measures 6.8?
Example 3: A swarm of bees grows according to the formula \( P = P_0e^{0.35t} \), where \( P_0 \) is the number present initially, and \( t \) is the time in days. How many bees will be present in 6 days if there were 1000 present initially?

Half-Life:

The half-life of a substance is the time it takes for the substance to decay to \( \frac{1}{2} \) its original amount.

Example 4: A substance decays according to \( A = A_0e^{-0.045t} \), where \( A_0 \) is the initial amount and \( t \) is in hours. Determine the half life.