MATH 1030: Midterm 2 Study Guide

The following is an overview of the material that will be covered on the first exam.

1. Simple and Compound Interest
   - Know how to do computations with simple interest
   - Know the compound interest formula for an account that compounds n times per year.
   $$A = P\left(1 + \tfrac{APR}{n}\right)^{nY}$$
   - Know the compound interest formula for an account that compounds continuously
   $$A = Pe^{APR \cdot Y}$$
   - Know how to compute the APY given the APR for an account. If the account is compounded n times per year, then $APY = \left(1 + \frac{APR}{n}\right)^{n} - 1$. If the account is compounded continuously, then $APY = e^{APR} - 1$.
2. Savings and Loan
   - You do *not* need to memorize the savings plan formula, but you do need to know how to use it:
   $$A = PMT \times \frac{\left(1 + \frac{APR}{n}\right)^{n \cdot Y} - 1}{\frac{APR}{n}}$$
   - You do *not* need to memorize the loan payment formula, but you do need to know how to use it:
   $$PMT = P \times \frac{\frac{APR}{n}}{1 - \left(1 + \frac{APR}{n}\right)^{-n \cdot Y}}$$
3. Linear vs. Exponential Growth/Decay
   - Determine whether a given situation is described by linear or exponential growth.
   - Find the domain and range of a given function.
4. Linear Models
   - Differentiate between the independent and dependent variables in a situation.
   - Find the slope/rate of change.
   - Graph linear functions.
   - Find the y-intercept.
   - Find the equation of a line. Know the point slope formula for the equation of a line. It is $y = mx + b$.
5. Exponential Models
   - Equation for exponential growth, given a growth/decay rate.
   $$Q = Q_0(1 + r)^t$$

- Equation for exponential growth, given the doubling time or half-life.

$$Q = Q_0 \cdot 2^{t/T_2} \qquad \text{and} \qquad Q = Q_0 \left(\tfrac{1}{2}\right)^{t/T_{1/2}}$$

- Find the doubling time or half-life, given a growth/decay rate, r.