# Key

## Formulas/Definitions

### Exponential Functions

For exponential growth, you _____, instead of _____ like in a linear function.

$$\text{multiply/divide} \qquad\qquad \text{add/subtract}$$

What is the growth/decay function? What does each letter represent?

$$y = Ab^x$$

$A =$ starting point/y-intercept

$b =$ growth or decay factor

How do we determine if a function is a growth or a decay without graphing it?

$\boxed{\text{growth}} \to A > 0$ and $b > 1$

$\boxed{\text{decay}} \to A > 0$ and $0 < b < 1$

What is common ratio?

base number / growth or decay factor

What is the initial/starting value?

"$A$", y-intercept

What is the formula for changing exponential functions to logarithm?

$$b^x = y \to \log_b y = x$$

What is the formula for changing from exponential to natural log?

$$e^x = y \to \ln y = x$$

# Interest

## Simple interest

Interest - $I = Prt$

Future Value - $FV = P(1 + rt)$

Present Value - $PV = \dfrac{FV}{(1 + rt)}$

## Compound Interest

m - number of compounding      $n - t \times m$      $i - \dfrac{r}{m}$

Future Value - $FV = P(1 + i)^n$

Future Value (continuous) - $FV = Pe^{rt}$

Present Value - $P = \dfrac{FV}{(1 + i)^n}$

Annual Percentage Yield (APY) -

$$r_E = \left(1 + \tfrac{r}{m}\right)^m - 1$$

## Annuities and Amortizations

What to fill in for Excel for each of the following?

Future Value of Ordinary Annuity - $= FV(\underset{i}{rate}, \underset{n}{nper}, -pmt, -pv, 0)$

Present Value of Ordinary Annuity - $= PV(\underset{i}{rate}, \underset{n}{nper}, -pmt, fv, 0)$

Future Value of Annuity Due - $= FV(\underset{i}{rate}, \underset{n}{nper}, -pmt, -pv, 1)$

Payment with FV/PV - $= PMT(\underset{i}{rate}, \underset{n}{nper}, -pv, fv, type)$

## Definitions of the following:

Simple Interest - based on original amount

Compound Interest - based on original plus earned interest

Ordinary Annuity - Paid at end of period

Annuity Due - paid at beginning of period

Compounding Continuously - Constantly earning interest