UNIT 1D THE MATHEMATICS OF FINANCE

COMPOUND INTEREST:

Suppose $\$P$ (the principal) is invested for t years at an interest rate of r (written as a decimal, not a percent), compounded m times a year. Then the amount the money is worth in t years is $\$A$ where

$$A = P\left(1 + \frac{r}{m}\right)^{mt}$$

INTEREST COMPOUNDED CONTINUOUSLY:

Suppose $\$P$ (the principal) is invested for t years at an interest rate of r (written as a decimal, not a percent), compounded continuously. Then the amount the money is worth in t years is $\$A$ where

$$A = Pe^{rt}$$

PRESENT VALUE:

This is just an idea of how much I need to invest today ($\$P$) in order to have $\$A$ later. We take this formula from earlier $A = P\left(1 + \frac{r}{m}\right)^{mt}$ and solve for P:

$$P = \frac{A}{\left(1 + \frac{r}{m}\right)^{mt}}$$

CLASS EXAMPLES

Sue lends Sara $5000 at an annual interest rate of 4.5% compounded annually.

How much interest does Sara need to pay if she borrows the money for exactly one year?

So how much interest should Sara pay if she borrows the money for only 100 days?

If you invest $1 in an account paying 10% interest, how much do you have after 10 years if ….

Interest is compounded annually?

Interest is compounded monthly?

Interest is compounded daily?

Bob and Bill can't agree on how to invest their money. Bob finds a bank that will pay 3.7% interest compounded annually, and Bill finds a bank that will pay 3.6% interest compounded continuously. If they invest $10,000 each today, who will have the most money in 5 years, and what's the difference in net worth between the two investments at that point?