

1030-09

Review Sheet - Midterm 2

Your second midterm exam will be given on Thursday, November 16, 2006. You will need to bring a calculator to this exam. Material for the exam will be taken from sections 4A-C, 8A-B, and 9A-C. The exam will have between 11-14 questions, and there will be at least 1 extra credit question.

1 Chapter 4

1.1 4A:

- Know the General Compound Interest Formula:

$$A = P \times \left(1 + \frac{\text{APR}}{n}\right)^{nY}.$$

- Use the compound interest formula for problems that ask how a single deposit of money accumulates wealth over a period of time.
- Be able to invert the formula and solve for the principal given the accumulated value:

$$P = \frac{A}{\left(1 + \frac{\text{APR}}{n}\right)^{nY}}.$$

- Know what the annual percentage yield (APY) is, and be able to find it given an APR and compounding time.

$$\text{APY} = \left(1 + \frac{\text{APR}}{n}\right)^n - 1.$$

- Know the Continuous compounding interest formula:

$$A = P \times e^{(\text{APR} \times Y)}.$$

1.2 4B:

- Know how to use the Savings Plan Formula. The formula itself will be given to you on the exam, but you will need to be able to plug values into the formula to solve for the accumulated amount, or alternatively for the monthly deposits.
- Use the savings plan formula for problems in which you are depositing money on a regular monthly (daily or yearly) basis.
- Be able to calculate the total return (relative change in investment value) and the annual return (average APY over a period of years).

$$\text{Total Return} = \frac{A - P}{P}, \text{ Annual Return} = \left(\frac{A}{P}\right)^{(1/Y)} - 1.$$

- Be able to manipulate powers and roots (i.e. fractional powers).

1.3 4C:

- Know how to use the Loan Payment Formula. The formula itself will be given to you on the exam, but you will need to be able to use the formula to solve word problems.

2 Chapter 8

- Know the difference between linear (change is an absolute amount) and exponential (change is a relative amount) growth and decay.
- Know the “Rule of 70” and when it’s a valid approximation (when P is less than 15%). This rule works for both the Doubling time and for the Half-life (for half-life P is the percent a quantity decreases by per time period).

$$T_d = \frac{70}{P} \text{ or } P = \frac{70}{T_d}.$$

- Know the Doubling Time Formula for exponential growth:

$$\text{N.V.} = \text{I.V.} \times 2^{t/T_d}.$$

- Know the Half-Life Formula for exponential decay:

$$\text{N.V.} = \text{I.V.} \times \left(\frac{1}{2}\right)^{t/T_H}.$$

- Know the two logarithm rules:

$$\log_{10}(x \times y) = \log_{10}(x) + \log_{10}(y) \quad (1)$$

$$\log_{10}(x^y) = y \times \log_{10}(x) \quad (2)$$

- Know the Exact Doubling time and Half-life formulas or be able to manipulate the logarithm function to get them.

$$T_d = \frac{\log_{10}(2)}{\log_{10}(1+r)},$$

$$T_h = -\frac{\log_{10}(2)}{\log_{10}(1-r)}.$$

3 Chapter 9

- Be able to determine the dependent variable from the independent variable of a function, $y = f(x)$.
- Know what the domain and range of a function are, and know how to draw the coordinate plane.
- Be able to plot a line given two points, or given m the slope, and b the y-intercept.
- Know how to find the rate of change (or slope) of a line.

$$y = mx + b.$$

$$m = \frac{\Delta y}{\Delta x}.$$

- Be able to plot the graph for both exponential growth and exponential decay.

- Know how to use logarithms to solve for something in the exponent.
- Be able to find the fractional growth rate r given the doubling time or the half-life of a function:

$$(1 + r)^{T_d} = 2 \Rightarrow 2^{1/T_d} - 1 = r.$$

- Be able to solve for t in the equation

$$\text{N.V.} = \text{I.V.} \times 2^{t/T_d} \Rightarrow t = T_d \frac{\log_{10}(\text{N.V.}/\text{I.V.})}{\log_{10}(2)}.$$