AMS 11A **Study Guide 1** ECON 11A

***No calculus***

**1.** A certificate of deposit offers an interest rate of 5.5% compounded daily for a term of 4 years. How much would you have to invest initially to have $25000 when the CD matures?

**2.** Use the change of base formula to compute the following logarithms. Do not use a calculator — express your answers in terms of $\ln 2$, $\ln 3$, $\ln 5$, and $\ln 7$. For example

$$\log_7 100 = \frac{\ln 100}{\ln 7} = \frac{\ln 10^2}{\ln 7} = \frac{2\ln 10}{\ln 7} = \frac{2(\ln 2 + \ln 5)}{\ln 7} = \frac{2\ln 2 + 2\ln 5}{\ln 7}.$$

(a) $\log_5 36 =$

(b) $\log_{20} 21 =$

(c) $\log_{10} \sqrt{75} =$

(d) $\log_{21} \dfrac{1}{\sqrt[3]{50}}$

**3.** Simplify the following expressions using properties of the natural log function.

(a) $\ln\left(\dfrac{x^2+3x+1}{5x+3}\right) =$

(b) $\ln \sqrt[3]{\dfrac{5xy^3}{x^2+y^2}} =$

**4.** Solve the equations.

(a) $3x^2 + 5x - 8 = 0$

(b) $\dfrac{2x+1}{x-2} = \dfrac{3x+5}{8-2x}$

**5.** Solve the pairs of equations.

(a) $\begin{cases} 4x + 5y = 7 \\ 3x + 4y = 13 \end{cases}$

(b) $\begin{cases} 3x - 2y = 1 \\ 5x + y = 2 \end{cases}$

(c) $\begin{cases} x^2 + 2x - 3y = -1 \\ 4x + 2y = 14 \end{cases}$

**6.** The demand equation for a monopolistic firm's product is $p = 20 - 0.4q$, where $p$ is the price/unit of the firm's product (measured in dollars) and $q$ is the daily demand for the firm's product, measured in 100s of units.

(a) Find the firm's ***revenue function***, $r = f(q)$, where $r$ is the firm's daily revenue. What kind of function is this (algebraically speaking)? What is its graph?

(b) Find the daily output that ***maximizes*** the firm's daily revenue.

*Don't use calculus, even if you already know how it may be applied to this problem, find an algebraic approach.*

(c) Find the price that the firm should set to maximize its daily revenue. What is the firm's maximum daily revenue *in dollars*?

(d) What is the firm's ***break-even*** average daily cost per unit, assuming maximum revenue?