

MATH 1090-8: QUIZ 8

November 8, 2007

no calculators allowed!

(Leave your solution in the form which could be entered into your calculator to obtain a numerical answer.)

1. Solve for x .

$$500 = 600 - 600e^{-0.4x}.$$

Solution. We isolate the exponential factor to find

$$e^{-0.4x} = \frac{1}{6},$$

and taking \ln of both sides gives

$$-0.4x = \ln(1/6).$$

So

$$x = -\frac{\ln(1/6)}{0.4}.$$

2. The demand function for a particular product is given by

$$p = \frac{200}{\log_2(q+3)}.$$

If the price is \$50, how many units will be demanded?

Solution. We are to solve

$$50 = \frac{200}{\log_2(q+3)}.$$

So

$$\log_2(q+3) = 4.$$

Raising both sides by 2 gives

$$q+3 = 2^4 = 16,$$

and so $q = 13$.3. Assuming 5% annual inflation, after t year the purchasing power of an initial investment of \$10,000 is given by

$$P = 10000e^{-0.5t}.$$

In how many years will the purchasing power be reduced to \$3,000?

Solution. We are to solve

$$3000 = 10000e^{-0.5t}.$$

So

$$e^{-0.5t} = 0.3$$

and taking \ln of both sides gives

$$-0.5t = \ln(0.3).$$

Thus

$$t = -\frac{\ln(0.3)}{0.5}.$$