**Mathematics 172**

**Quiz #4** Name: Key

***You must show your work to get full credit.***

**1.** Let $N_t$ have discrete exponential growth. Assume that $N_0 = 453$ and that $N_6 = 762$.

(a) Give a formula for $N_t$.

$N_t = N_0 \lambda^t = 453\lambda^t$

So $N_6 = 453\lambda^6 = 762$

$\lambda^6 = 762/453$

$\lambda = (762/453)^{(1/6)}$

$= 1.091$

$N_t =$ $453(1.091)^t$

(b) What is the doubling time for $N_t$?

Solve

$N_t = N_0(1.091)^t = 2N_0$

$(1.091)^t = 2$

$t \ln(1.091) = \ln(2)$

$t = \ln(2)/\ln(1.091)$

$= 7.959$

Doubling time is 7.959

(c) When does $N$ reach 50,000?

Solve

$N_t = 453(1.091)^t = 50000$

$(1.091)^t = 50000/453$

$t \ln(1.091) = \ln(50000/453)$

$t = \ln(50000/453)/\ln(1.091)$

$= 54.01$

$t =$ 54.01