

Mathematics 172

Quiz #1

You must show your work to get full credit.

Four bears are introduced into a park. The growth rate of the bear population is .25 bears/year.

- (1) What is the number, N_t , of bears after t years?

Solution: The formula for exponential growth is $N_t = (1 + r)^t N_0$. In our case $N_0 = 4$ and $r = .25$. Thus

$$N_t = 4(1.25)^t$$

- (2) How long until the population of bears reaches 100?

Solution: We wish to solve the equation $N_t = 100$ for t . That is to solve the equation

$$4(1.25)^t = 100.$$

Divide by 4

$$(1.25)^t = 25$$

Take the natural logarithm

$$t \ln(1.25) = \ln(25)$$

and thus

$$t = \frac{\ln(25)}{\ln(1.25)} = 14.42513488 \text{years}$$