
Math B Week 16 Homework: Exponentials and Logs
Due Monday 5 June 2006
Mr. Quinn

1. If a baseball card that is worth 20 dollars increases in value at a rate of 7 % a year, how much will it be worth in 100 years?
2. If a car that cost \$18,000 decreases in value by 14 % a year, how much will it be worth in 5 years?
3. If you owe \$1,000 on your credit card and interest increases this by 3 % a month, how much will you owe after 3 years?
4. If you're going to retire in 35 years, which is better: investing \$1,000 at 10 % a year interest, or \$500 at 12 % a year interest?
5. Mr. Bowen started teaching 8 years ago at a salary of \$40,000, and he has gotten a 4 % raise each year since. What is his salary now?
6. If a population of endangered penguins contains 312 birds and is decreasing by 11 % a year, how many will be left in 10 years? In how many years will there be fewer than 50?

A used car was purchased in July 1999 for \$11,900. If the car depreciates 13% of its value each year, what is the value of the car, to the *nearest hundred dollars*, in July 2002?

What is the value of x in the equation

$$81^{x+2} = 27^{5x+4} ?$$

Growth of a certain strain of bacteria is modeled by the equation $G = A(2.7)^{0.584t}$, where:

G = final number of bacteria

A = initial number of bacteria

t = time (in hours)

In approximately how many hours will 4 bacteria first increase to 2,500 bacteria?

Round your answer to the *nearest hour*.

Solve algebraically for x : $8^{2x} = 4^6$

An amount of P dollars is deposited in an account paying an annual interest rate r (as a decimal) compounded n times per year. After t years, the amount of money in the account, in dollars, is given by the equation

$$A = P\left(1 + \frac{r}{n}\right)^{nt}.$$

Rachel deposited \$1,000 at 2.8% annual interest, compounded monthly. In how many years, to the *nearest tenth of a year*, will she have \$2,500 in the account? [The use of the grid is optional.]

Sean invests \$10,000 at an annual rate of 5% compounded continuously, according to the formula $A = Pe^{rt}$, where A is the amount, P is the principal, $e = 2.718$, r is the rate of interest, and t is time, in years.

Determine, to the *nearest dollar*, the amount of money he will have after 2 years.

Determine how many years, to the *nearest year*, it will take for his initial investment to double.

The lateral surface area of a right circular cone, s , is represented by the equation

$$s = \pi r \sqrt{r^2 + h^2},$$
 where r is the radius of the circular base and h is the height of the cone.

If the lateral surface area of a large funnel is 236.64 square centimeters and its radius is 4.75 centimeters, find its height, to the *nearest hundredth of a centimeter*.

The scientists in a laboratory company raise amoebas to sell to schools for use in biology classes. They know that one amoeba divides into two amoebas every hour and that the formula $t = \log_2 N$ can be used to determine how long in hours, t , it takes to produce a certain number of amoebas, N . Determine, to the *nearest tenth of an hour*, how long it takes to produce 10,000 amoebas if they start with one amoeba.

The expression $\log 10^{x+2} - \log 10^x$ is equivalent to

- [A] -2 [B] $\frac{1}{100}$ [C] 100 [D] 2