

EXPONENTIAL FORMULAS

Expo Growth Decay Population
 END Amount
 $N = N_0(1 \pm r)^t$
 original Amount (Begin)
 ↑ rate % (decimal)
 time
 Increasing Decreasing value of item

$A = P\left(1 + \frac{r}{n}\right)^{nt}$
 Compound at a specific interval

Compound Interest
 A = ending Amount
 P = Principal (Original Amount)
 r = rate % t = time
 n = how many times compounded
 $A = Pe^{rt}$
 Compound continuously

EXPONENTIAL WORD PROBLEMS

In DeSoto Central High School, the population of students is 1700. If the average yearly growth rate of 7%, project the population in 8 years.

$$N = N_0(1 + r)^t$$

$$1700(1 + .07)^8$$

$$N = 2921$$

You deposit \$1000 in an account that earns 5.5% annual interest. Find the balance after 6 years if the interest compounds monthly. (12)

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

$$1000\left(1 + \frac{.055}{12}\right)^{12(6)}$$

$$A = 1,389.92$$

How much principal should you invest into an account that earns 5% interest compounded quarterly, if after 5 years, you want to have a balance of \$5,000? 4

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

$$5000 = P \left(1 + \frac{.05}{4}\right)^{4(5)}$$

$5000 = 1.282 P$

$$P = 3900$$

You bought a house for \$315,000 in 2012. The interest rate is 4.25% compounded monthly. How much interest will you have paid in 30 years?

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

$$A = 315,000 \left(1 + \frac{.0425}{12}\right)^{12(30)}$$

$$A = 1,124,755.00$$

$$I = \frac{A - P}{1}$$

| |
|------------|
| 1,124,755 |
| - 315,000 |
| ----- |
| \$ 809,755 |

In Mississippi, the population of teachers is 3,225. If the average yearly decay rate is 4.5%, project the population in 4 years.

$$N = N_0 (1 - r)^t$$

$$3,225 (1 - .045)^4$$

$$N = 2,683$$

You deposit \$30,000 in an account that bears 5.4% interest compounded continuously. How much money will you have in 7 years?

$$A = Pe^{rt}$$

$$A = 30,000 e^{(.054)(7)}$$

$$A = 43,780.89$$