

FORMULA: COMPOUND INTEREST

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

1. You deposit \$3600 in an account that earns 3.55% annual interest. Find the balance after 6 years if the interest is compounded with the given frequency.
  - a. quarterly
  - b. monthly
  - c. daily
  
2. You want to have \$12,000 in your account after 8 years. Find the amount your initial deposit should be for each of the following described situations.
  - a. The account pays 4.5% annual interest compounded monthly.
  
  - b. The account pays 2.75% annual interest compounded quarterly.
  
3. In 1990, Georgia recorded a population of 8,186,453. The population increased at an annual rate of 3.67% per year.
  - a. Write an exponential model for the population after  $t$  years.
  
  - b. What will the population be in 2012?
  
4. A new car costs \$38,000. The value of the car decreases by 24% each year.
  - a. Write an exponential model for the value of the car after  $t$  years.
  
  - c. Estimate the value of the car after 6 years.
  
5. You want to have \$20,000 in your account in 4 years. The account is compounded monthly with a 5.75% interest rate. Find the amount your initial deposit should be for each of the following described situations.

6. In 2012 the city of Austin was ranked as the fastest growing city in the United States. Their population was 820,611. Experts predict that their population will continue to grow at 2.8% until 2016.

a. Write an exponential model for the population after  $t$  years.

b. What will the population be in 2016?

7. A certain type of bacteria, given a favorable growth medium, doubles in population every hour. Given that there were approximately 100 bacteria at the start of the experiment:

a. Write an exponential model for the number of bacteria after  $t$  hours.

b. What will be the estimated population of the bacteria culture after 12 hours?

8. If you deposit \$6500 into an account that pays 3.25% interest, compounded weekly, how much money will you have after:

a. 6 years?

b. 12 years?

9. In 2010, the population of China was around 1,400,000,000 and growing at a rate of 1.65% per year.

a. Write an exponential model for the population after  $t$  years.

b. What will the population be in 2020?

10. Motorcycles have the fastest depreciation rates of all vehicles, 23.5%. Assume you purchased a new motorcycle for \$17,000.

a. Write an exponential model for the value of the motorcycle after  $t$  years.

b. Estimate the value of the bike after 6 years.