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| **Growth Formula:**$$A\left(t\right)= a(1+r)^{t}$$**Decay Formula:**$$A\left(t\right)= a(1-r)^{t}$$*a* = initial amount, *r* = percent of increase/decrease, *t* = time | **Compound Interest Formula:**$$A=P\left(1+\frac{r}{n}\right)^{nt}$$*A* = end amount, *P* = initial amount, *r* = rate, *t* = time, *n* = number of compounding periods per year |

1. The population of a colony of beetles is 65 and grows 30% each week for 10 weeks.

a) Write an equation that models the function.

b) How many beetles are there after 10 weeks?

2. At the first game of the season, 23, 500 fans filled the FedEx Forum for Memphis Tigers. The attendance for a basketball team declined 5% per game throughout a losing season.

a) Write an equation that models the function.

b) How many fans were at the 15th game?

3. Brooke’s parents opened a savings account with a 6.5% interest rate for her when she was born and deposited $1500. How much will it be worth in 18 years?

4. An investment account pays 5.4% annual interest compounded quarterly. If $4000 is place in this account, find the balance after 8 years.

5. At a wholesale food distribution center, the price of sugar has increased 6.3% annually since 1980. Suppose sugar cost $0.43 per pound in 1980 and this growth continues. What will a pound of sugar cost in 2017?

6. At the Renaissance Hotel and Convention center in Nashville, the cost of a hotel room has increased 5.1% annually. If the average hotel room cost $45.00 in 1980 and this growth continues, what will an average hotel room cost in 2016?

7. The Randolph family bought a house 12 years ago for $95,000. The house is now worth $167,000. Assuming a steady rate of growth, what was the yearly rate of appreciation?

8. In 2009, Lucy received $10,000 from her grandmother. Her parents invested all of the money, and by 2021, the amount will have grown to $16,960.

a. Write an exponential function that could be used to model the money *y*. Write the function in terms of *x*, the number of years since 2009.

b. Assume that the amount of money continues to grow at the same rate. What would be the balance in the account in 2031?

9. A college savings account pays 13.2% annual interest compounded semiannually. What is the balance of an account after 12 years if $21,000 was initially deposited?

10. What would be a more beneficial change to a 5-year loan at 8% interest compounded monthly: reducing the term to 4 years **or** reducing the interest rate to 6.5%?