

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

Continuous Compounding $A = Pe^{rt}$

1. Kathy saved small dollar amounts throughout the school year and now has \$712. She can choose from two bank offers. The first is 5.3% compounded continuously for 6 years. The second is compounded quarterly for 5 years at 6%. Which account will yield the most money? What is the dollar amount difference between the accounts at the end of their terms?
2. There are currently 400 deer in Flagstaff. The population is increasing continually at a rate of 4.2%. How many deer will there be in 8 years?
3. After you buy a car it decreases in value by about 16% each year. If the car cost \$24,000 new how much will the car be worth in 2 years? How much will it be worth in 5 years?
4. Due to pollution the fish population of the local lake is decreasing at a rate of 5.2% each year. If the population today is 15,000 fish how many fish will there be in 7 years? How many in 15 years?
5. The population of rats continuously increases at a rate of 3.2% each year in New York City. If it is estimated that there are currently 300,000 rats now, how many will there be in 10 years?
6. A customer purchases a television for \$800 using a credit card. The interest is charged on an unpaid balance at a rate of 18% per year compounded monthly. If the customer makes no payments for the whole year, how much is owed at the end of the year?
7. A new boat will decrease in value by 12% each year. If the boat originally cost \$45,000 how much will it be worth in 5 years? How much in 15 years?

8. You deposit \$1,200 into an account that pays 3% interest. How much money would you have in 10 years if the amount was compounded
- a) Annually b) Quarterly c) Monthly d) Continuously

Graph the following exponential functions. State whether each function is a growth or decay function. Be sure to plot at least 5 points (make a table of values and plug in for $x = -2, -1, 0, 1, 2$).

9. $f(x) = 2\left(\frac{1}{2}\right)^x$

10. $f(x) = 3\left(\frac{5}{3}\right)^x$

11. $f(x) = \frac{1}{2}(4)^x$

12. $f(x) = 3(3)^{-x}$

13. $f(x) = 2^{x-3} + 4$

14. $f(x) = 4^{x+2} - 2$

Simplify the following expressions:

15. $\frac{2(3x^2)y^3}{4xy}$

16. $\frac{x^{-3}y^3x^2}{xyy^{-2}z^3}$

17. $5(x^3)^{\frac{4}{3}}$

18. $\frac{5x(2x - y^3)^4}{2y(2x - y^3)}$