

Doubling Time Growth Model $A = A_0 2^{\frac{t}{d}}$

A = Population at time t, A_0 is Population at time 0, d = Doubling time

Gillette has a population of about 32,000 and it is estimated that the population will double every 15 years.

What will be the population in 8 years?

What will be the population in 2040?

Relative Growth Rate. $A = A_0 e^{kt}$

A = Population at time t A_0 is Population at time 0 k = relative growth rate (as a decimal)

The population of antelope in Wyoming has a relative growth rate of 1.2% per year. It is estimated that there were 520,000 antelope in Wyoming in 2010.

What is Wyoming's present antelope population?

How about in 2040?

$$A = A_0 \left(\frac{1}{2} \right)^{\frac{t}{h}}$$

Half-life (Negative Exponential Growth)

A = Amount at time t, A_0 = Amount at time t=0, h = half-life

Barium-122 has a half-life of 2 minutes. A fresh sample weighing 80 g was obtained. If it takes 11 minutes to set up an experiment using barium-122, how much barium-122 will be left when the experiment begins?

Mercury -197 is used for kidney scans and has a half-life of 3 days. If the amount of mercury-197 needed for a study is 2 grams and the time allowed for shipment is 12 days, how much mercury-197 will need to be ordered?

Variation Problems

y varies directly with x. y=14, when x = 2, find y when x = 4

t varies inversely with the square root of v. $t = 7$ when $v = 25$. Find t, when $v = 16$

y varies jointly with the cube of x and inversely with the square of t. $y = \frac{1}{2}$ when $x=3$ and $t=4$. Find t when $y=3$ and $x = 2$.

The time (t), in hours, it takes to travel to Fort Collins varies inversely with your rate of speed (r), in mph. If it takes you 4 hours traveling at 75 miles per hour, how fast do you need to drive if you want to arrive in 3.5 hours?

Convert the following. You do NOT need to show work in this section.

125 mm to meters _____ meters

17.4 kilograms to centigrams _____ centigrams

4.781 meters to centimeters _____ centimeters

314.82 milliliters to liters _____ liters

Convert the following. Show your work.

38 miles to feet

4.8 liters to quarts

54 inches to centimeters

481 centimeters to feet

26 feet per second to miles per hour