The population of a city in 1950 was 25,800. The population has been increasing 2.75% each year.

$100 + 2.75 = 102.75\%$

1. Write an exponential equation to model this situation:

$y = a(b)^x \longrightarrow y = 25{,}800(1.0275)^x$

2. Find the population in 2000? $x = 50$

100,164

3. What was the population in 1945?

22,527 $x = -5$

The value of a business has been decreasing 7.8% each year. The value of the business in 2008 was $575,000.

$100 - 7.8 = 92.2\%$ $b = 0.922$

1. Model this situation with an exponential equation.

$y = a(b)^x \longrightarrow y = 575{,}000(0.922)^x$

2. Find the value of the business in 2015.

$325,674.90 $x = 7$

3. Find the value of the business in 2000.

$1,101,084.06 $x = -8$

You invest $20,000 in an account that pays 7.5% annual interest.

What is the initial amount? $a = 20{,}000$

What is the growth factor? $b = 1.075$

How much will you have in 30 years? $20{,}000(1.075)^{30}$

$175,099.10

The number of bacteria cells doubles every 30 minutes.

If there are 40 cells at noon, how many will there be at 6:00pm that same day?

$a = 40$

$b = 2$

$y = 40(2)^x = 40(2)^{12}$

$= 163840$

How many would there be if the cells doubled every 20 minutes?

$40(2)^{18} = 10{,}485{,}760$

The number of cells doubles every 10 minutes.

There are 75 cells at 1:00pm. Find the number of cells at 1:45pm the same day.

1:00 pm → 1:45 pm

$y = a(b)^x$

$\frac{45 \text{ min}}{10 \text{ min}}$

$y = 75(2)^x$

$x = 4.5$

$75(2)^{4.5} = 1697$

The half-life of a certain medication is 2 hours.

If you take a 240mg dose of this medication at 8:00 am, how much will still be in your system at noon the same day?

$y = a(b)^x$ ← .5

$x = \frac{4 \text{hr}}{2 \text{hr}} = 2$

$y = 240(.5)^2 = 60 \text{mg}$

The half-life of a radioactive substance is 40 minutes. There are 500 grams of this substance at 4:00pm. How much remains at 7:00 pm the next day?

27hrs x 60min

$= 1620 \text{ min}$

$\div 40 \text{ min}$

40.5

$y = 500(.5)^{x}$ ← 40.5

$3.2155... E^{-10}$