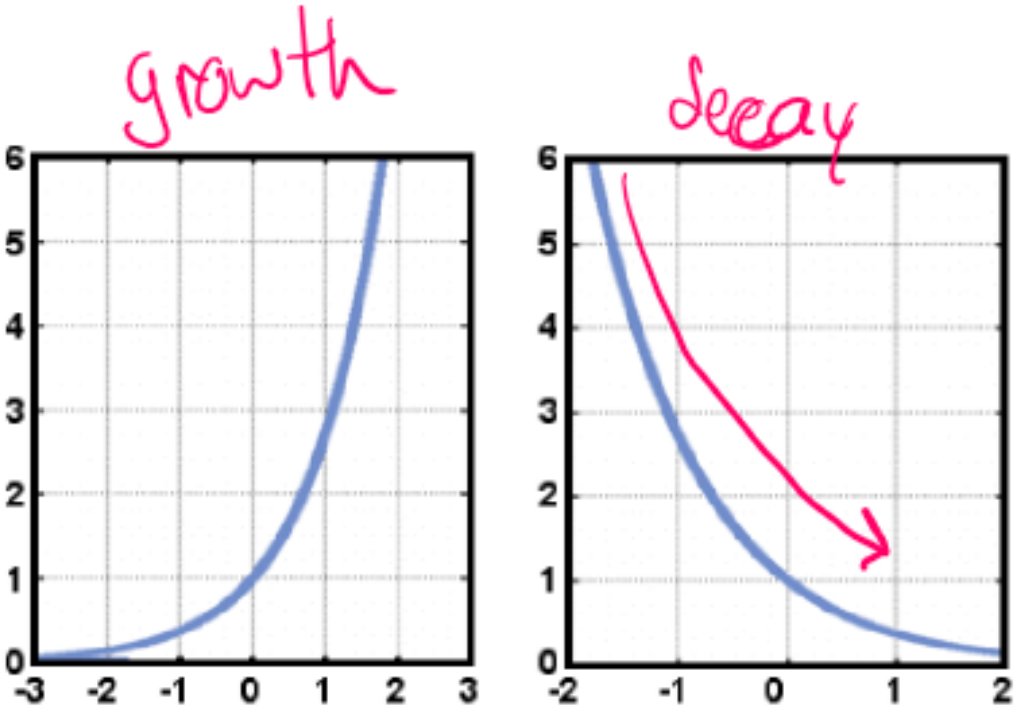
Exponential Growth

$$A = P(1 + r)^t$$



Exponential Decay

$$A = P(1 - r)^t$$

Mr. Foster is starting a new job. His salary for the first year is $30,000. He will receive a 5% raise each year after that. Write a formula to define Mr. Foster's salary, s, for the nth year.

$A = S$
$P = 30000$
$r = 0.05$
$t = n$

$S = 30000(1+0.05)^n$

How much will Mr. Foster make after 7 years?

$S = 30000(1+0.05)^7$

$= \$42213.01$

In 2000, the world population was about 6.09 billion. During the next 13 years, the world population increased by about 1.18% each year. Write an exponential equation giving the population y (in billions) n years after 2000.

$A = y$
$P = 6.09$
$r = 0.0118$
$t = n$

$y = 6.09(1+0.0118)^n$

Estimate the world population in 2005.

5 years after 2000

$y = 6.09(1+0.0118)^5$

$A = 6.458$ billion

Janet purchased a new car for $25,000. The moment, she drove the car off the lot, it began depreciating 15% per year. Write a formula to define the value of Janet's car, v, after n years.

$A = P(1-r)^t$

$A = v$
$P = 25000$
$r = 0.15$
$t = n$

$V = 25000(1-0.15)^n$

How much is Janet's car worth after 4 years?

$V = 25000(1-0.15)^4$

$= \$13050.16$

You take a 325 milligram dosage of ibuprofen. During each subsequent hour, the amount of medication in your bloodstream decreases by about 29% each hour. Write an exponential equation giving the amount y (in milligrams) of ibuprofen in your bloodstream t hours after the initial dose.

$A = y$
$P = 325$
$r = 0.29$
$t = t$

$y = 325(1-0.29)^t$

How much ibuprofen will remain in your bloodstream after 3 hours?

$y = 325(1-0.29)^t$

$y = 116.321$ mg

Appreciation/Depreciation Practice Name_____

1. The world population in 2000 was approximately 6.08 billion. The annual rate of increase was about 1.26%. Find the world population in 2010.

$A = 6.08(1 + .0126)^{10}$

6.89 billion

2. A computer valued at $6500 depreciates at the rate of 14.3% per year. Find the value of the computer after three years.

$A = 6500(1 - .143)^{3}$

$4091.25

3. The population of a certain animal species decreases at a rate of 3.5% per year. You have counted 80 of the animals in the habitat you are studying. Predict the population of the animals in 5 years.

$A = 80(1 - .035)^{5}$

67 animals

4. A car's value depreciates at a rate of 9% each year. Find the current value of a car purchased for $25,000 six years ago.

$A = 25000(1 - .09)^{6}$

$14,196.73

5. Bill has a baseball card worth $50. Its value increases at 3% per year. How much will the card be worth in 10 years?

$A = 50(1 + .03)^{10}$

$A = \$67.20$

new truck that sells for $29,000 depreciates in value 12% per year. Find the value of the truck 7 years.

$A = 29000(1-.12)^7$

$11851.59

he bear population increases at a rate of 2% per year. There are 1573 bears this year. How ny will there be in 10 years?

$A = 1573(1+.02)^{10}$

1917 bears

An investment of $75,000 increases at a rate of 12.5% per year. Find the value of the investment ter 30 years.

$A = 75000(1+.125)^{30}$

$2,568,247.87

. The population of an endangered bird is decreasing at a rate of 0.75% per year. There are urrently about 200,000 of these birds. How many of these birds will there be in 100 years?

$A = 200000(1-.0075)^{100}$

94,207 birds