Applications of Exponential Functions

$y = a(1+r)^t$ Growth

$y = a(1-r)^t$ Decay

a: original amount
r = % as a decimal
t = time in years

1. Kaitlyn received $1,000 for her birthday. She deposited it into an account that pays 6.5% annually. Find the balance in the account after 5 years.

$y = a(1+r)^t$

$a = 1000$
$r = 6.5\% = .065$
$t = 5$

$y = 1000(1+.065)^5$

$y = 1000(1.065)^5$

$y = 1000 * 1.37009$

$y = \$1370.09$

2. Kaitlyn received $1,000 for her birthday. She deposited it into an account that pays 6.5% quarterly. Find the balance in the account after 5 years.

4 times per year

$y = a(1+r)^t$

$a = 1000$
$r = .065 \div 4 = .01625$
$t = 5 \times 4 = 20$

$y = 1000(1+.01625)^{20}$

$y = 1000(1.01625)^{20}$

$y = 1000 \times 1.38042$

$y = \$1380.42$

3. The population of a city was 150,600 in 2002 and is decreasing at a rate of 1.5% per year. What will the population be in the year 2007?

$y = a(1-r)^t$

$a = 150,600$

$r = 1.5\% = .015$

$t = 5$

$y = 150,600(1-.015)^5$

$y = 150,600(.985)^5$

$y = 150,600 \times .927217$

$y = 139,639 \rightarrow$ 2007 population