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Find Worksheet - HW 9.2 - Day 2

9.3 Modeling Exponential Growth & Decay

Exponential Growth - population, financial investments

Exponential Decay - population, depreciation

$$A = a(1 \pm r)^t$$

$A \rightarrow$ new value

$a \rightarrow$ initial value

$r \rightarrow$ rate of change (% converted to a decimal)

$1 \pm r \rightarrow$ base

$t \rightarrow$ time

*rate of change over a span of time

1. If the population of a small village in Maine is 100 and grows by approximately 6% a year, how large will the population be in 20 years?
   a. Identify the variables.
   b. Calculate the answer.

a. $a = 100$
$r = 6\% = .06$
$t = 20$ yrs

b. $A = a(1+r)^t$
$A = 100(1+.06)^{20}$
$A = 100(1.06)^{20}$
321 people

2. A bank is advertising a rate of 5% interest compounded annually. If $2000 is invested in an account at that rate, find the amount of money in the account after 10 years.

$A = a(1+r)^t$
$A = 2000(1+.05)^{10}$
$A = 2000(1.05)^{10}$
$3257.79

3. The population of a town is decreasing at the rate of 2.5% per year. If the population in the year 2000 was 28,000, what will be the expected population in 2015 if this rate of decrease continues? Give the answer to the nearest thousand.

$A = a(1-r)^t$
$A = 28{,}000(1-.025)^{15}$
$A = 28{,}000(.975)^{15}$
19,000 people

4. The local library bought a new copier for $6,000. It will decrease in value at a rate of 7% per year. How much will the copier be worth in 4 years?

$A = a(1-r)^t$
$A = 6000(1-.07)^4$
$A = 6000(.93)^4$
$4488.31

5. The rate of growth of one type of bacteria that causes tooth decay is 12% per hour. If Melissa forgets to brush her teeth tonight, the population of 3,100 bacteria in her mouth has 10 hours to multiply. Approximately how many of these bacteria will be in her mouth to the nearest whole number?

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

$A = 3100(1+.12)^{10}$

$A = 3100(1.12)^{10}$

9628 bacteria

HOMEWORK

Worksheet - HW 9.3