Solve Exponential Growth and Decay Applications

a) Does this equation represent growth or decay? _____

b) What is the rate of growth or decay? _____

c) What is the initial value? _____

d) Evaluate for x = 3 _____

Finance Applications

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = end amount

P = Initial amount

r = rate (as a decimal)

n = number of times compounded

t = time (years, months, etc)

Compounded	n=
Annually	n = 1
Bi-annually	n = 2
Quarterly	n = 4
Monthly	n = 12
Weekly	n = 52
Daily	n = 365

Write a compound interest function to model each situation. Then find the balance after the given number of years.

1. $1000 invested at a rate of 3% compounded quarterly for 5 years.

Step 1: label variables

P = 1000

r = .03 (always as a decimal)

n = 4

t = 5

Step 2: Substitute the numbers into the formula.

$$A = 1000\left(1 + \frac{.03}{4}\right)^{4 \cdot 5}$$

Step 3: plug the numbers into your calculator to solve.

A = $1161.18 (round to nearest hundredth)

2. $18,000 invested at a rate of 4.5% compounded annually for 6 years.

Step 1: label variables

P = 18000

r = .045 (always as a decimal)

n = 1

t = 6

Step 2: Substitute the numbers into the formula.

$$A = 18000\left(1 + \frac{.045}{1}\right)^{1 \cdot 6}$$

Step 3: plug the numbers into your calculator to solve.

A = $23440.68 (round to nearest hundredth)

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Extension:

What "r" value would be used if the principle is being doubled every year?

$$y = P(2)^x$$

What about if it is tripled?

$$y = P(3)^x$$
