Name _____ Date _____

Calculating Compound Interest

Compound Interest

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

where A = amount, P = principal, r = rate, t = time in years, and n = number of times compounded per year.

Solve the story problems assuming no deposits or withdrawals.

1. Heather received $100 for her 13th birthday. If she saves it in a bank with 3% interest compounded quarterly, how much money will she have in the bank by her 16th birthday?

2. Roland earned $1,500 last summer. If he deposited the money in a certificate of deposit that earns 4% interest compounded monthly, how much money will he have next summer?

3. The C.R.E.A.M. Company has an employee savings plan. If an employee makes an initial contribution of $2,500 and the company pays 5% interest compounded quarterly, how much money will the employee have after 10 years?

4. Juan invests $7,500 at 6% interest for one year. How much money would he have if the interest were compounded
   a. Yearly?
   b. Daily?
   c. Why are the amounts in answers *a* and *b* different?

5. Carmen is saving for a new car that costs $15,000. If she puts $5,000 in an account that earns 6% interest compounded monthly, how long will it take for her to save enough money to buy the car?

0-7424-1789-1 Algebra II

Name _____ Date _____

Exponential Decay (Half-life)

$$y = a\left(\frac{1}{2}\right)^x$$

where a = initial amount

x = number of half-lives = $\frac{\text{time}}{\text{half-life}}$

y = remaining

Solve each problem.

1. There are 10 grams of Curium-245 which has a half-life of 9,300 years. How many grams will remain after 37,200 years?

2. There are 80 grams of Cobalt-58 which have a half-life of 71 days. How many grams will remain after 213 days?

3. The half-life of Rhodium-105 is 1.5 days. If there are initially 7500 grams of this isotope, how many grams would remain after 30 days?

4. Two hundred ten years ago there were 132,000 grams of Cesium-137. How much is there today? The half-life of Cesium is 30 years.

5. In a nuclear reaction, 150 grams of Plutonium-239 are produced. How many grams would remain after one million years? The half-life of Plutonium-239 is 24,400 years.

6. Using carbon dating, scientists can determine how old a fossil is by how much Carbon-14 is present. If an average animal carcass contains 1 gram of Carbon-14, how old is a fossil with 0.0625 grams of Carbon-14? The half-life of Carbon-14 is 5730 years.

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