Algebra2/Trig
Mixed Real World Problems

Name _____
Block _____ Date _____

Trust Fund A: $25,000 was deposited 25 years ago and has been continuously earning interest at a rate of 9.5%

Trust Fund B: $5000 was deposited 50 years ago and has been earning interest at a rate of 8% compounded quarterly.

Formulas for Compound Interest:

1. For n compounding per year:

   A =

2. For continuous compounding:

   A =

A =

P =

r =

t =

n =

Example:

1. Suppose it is going to cost about $35,000 a year for you to attend a four year college. The best possible interest rate your bank is offering is 7% compounded quarterly and you know you only have 18 years to save. How is this possible?

Formulas for Growth and Decay:

1. Growth

   Y =

2. Decay

   Y =

Examples:

1. In 1990, the cost in tuition at a state University was $4300. During the next 8 years, the tuition rose 4% each year. Write a model that gives the tuition *y* (in dollars) *t* years after 1990. How much is tuition in 1998?

2. You bought a new car for $24,000. The value of the car, *y*, decreases by 16% each year. Write an exponential decay model for the car's value. Estimate the car's value after 2 years

PRACTICE PROBLEMS

1. Suppose Karen has $1000 that she invests in an account that pays 3.5% interest compounded quarterly. How much money does Karen have at the end of 5 years?

2. William wants to have a total of $4000 in two years so that he can put a hot tub on his deck. He finds an account that pays 5% interest compounded monthly. How much should William put into this account so that he'll have $4000 at the end of two years?

3. Kelly plans to put her graduation money into an account and leave it there for 4 years while she goes to college. She receives $750 in graduation money that she puts it into an account that earns 4.25% interest compounded semi-annually. How much will be in Kelly's account at the end of four years? How much interest did she earn?

4. Suppose $5000 is put into an account that pays 4% compounded continuously. How much will be in the account after 3 years?

5. If interest is compounded continuously at 4.5% for 7 years, how much will a $2000 investment be worth at the end of 7 years?

6. If $8000 is invested in an account that pays 4% interest compounded continuously, how much is in the account at the end of 10 years?

7. The number of fruit flies after t hours is given by $Q(t) = 20e^{0.03t}$ where $t \geq 0$. What is the population after 3 days?

8. You buy a stereo system that costs $780. Each year t, the value V of the stereo system decreases by 5%. Write an exponential decay model that describes the situation. How much is the stereo system worth after 2 years?

9. You purchase an antique table for $525. Each year t, the value V of the table increases by 5.5% Write an exponential growth model that describes the situation. How much will the table be worth in 25 years?

10. You drink a beverage that has 120 milligrams of caffeine. Each hour h, the amount c of caffeine in your system decreases by about 12%. Write an exponential decay model that describes the situation. How much caffeine is in your system after an hour and a half?