How Do You Grow Your Money?

One of the primary ways we use exponential growth is in talking about financial accounts. Today we'll explore how your money can make more money with interest!

1. You just earned a $1000 bonus at your job. Would you rather receive all the money at the end of the year or half the money now and half the money later? Why?

2. Consider a magical bank that offers you 100% interest at the end of the year. If you put $1000 into this account, how much would you have after one year?

3. Instead of being paid the 100% interest in one lump sum, let's consider what happens when we get interest paid out multiple times in the year in smaller increments. We'll explore interest that is earned quarterly.
   a. Will the amount of interest earned be the same each quarter? How do you know?

   b. Fill in the table to see how the money in the account is changing. Show your work.

Amount invested	% interest earned each quarter	Amount in account after 1st quarter	Amount in account after 2nd quarter	Amount in account after 3rd quarter	Amount in account at end of year
$1000					

4. How does the amount in the account after 1 year compare to your answer in question 2? Why do you think this happens?

5. Is it even better to earn interest monthly or weekly? What about daily? Fill out the table to explore these options.

Amount invested	Interest is earned…	Number of pay-outs per year	% interest earned each pay-period	Amount in account at end of year
$1000	Monthly			
$1000	Weekly			
$1000	Daily			

6. a) Do you think you could triple your money if you received payments multiple times a day?

   b) What is the most money you could have in your account after one year with the same initial investment of $1000?

Lesson 4.6 – Modeling with the Natural Base "e"

QuickNotes

Check Your Understanding

1. Estimates of the numbers (in millions) of US households with digital televisions is given by $D = 30.92(1.012)^t$ where t represents years after 2000.
   a. Is the number of households with digital televisions increasing or decreasing between 2003 and 2007? Justify your answer.

   b. What does the 30.92 represent? What does the 1.012 represent?

   c. Use the model to estimate the number of US households with digital televisions in 2015.

2. On the day of a child's birth, a deposit of $25,000 is made in a trust fund that pays 8.75% interest. Determine the balance in this account on the child's 25th birthday if interest is compounded weekly, monthly, and continuously.

3. The number of bacteria in a certain population increases according to a *continuous exponential growth model* at a rate of 8.1% per hour. There are 1800 bacteria at $t = 0$.
   1. Write an equation that gives the number of bacteria after t hours.

   2. Find the number of bacteria in the population after 6 hours.

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