Name _____ Date _____ Class # _____ Block _____

Intro to Calculus

Money Changes Everything— an exploration of the number *e*.

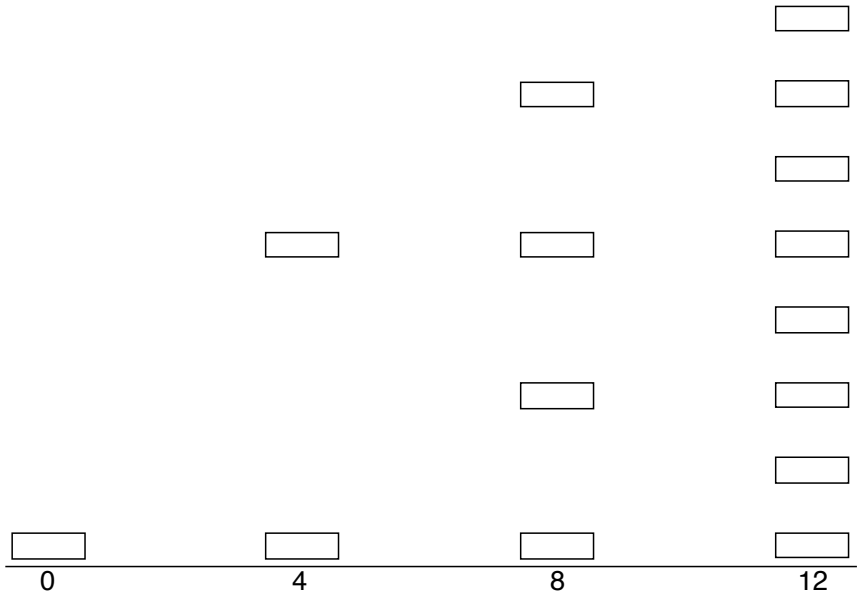
Goals

I can use what I learned about discrete and continuous exponential growth to develop new ideas.

For questions 1 to 4 suppose that you invest $1 in an account earning 50% annual interest compounded every 4 months for 1 year.

1. Complete the table and growth diagram to find the total value after 1 year.

Annual Growth	Number of Compounds	Growth per Compound



Total = _____

2. Show how to use our noodle equation to calculate the total.

3. Write an equation for the total in terms of *n* compounding periods.

4. Suppose you let *n* become really, really large, what's the approximate total?

5. How much would you have had if you had been getting a 100% annual return compounded continuously?

6. Conjecture how you could use the number *e* to calculate the total value of $1 invested at an annual rate of return of 50% compounded continuously for 1 year.

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7. If you invested $1 at an annual interest rate of 25% for 1 year compounded continuously your total at the end of the year would be $1.28. At the end of two years it would be $1.65. At the end of 3 years it would be $2.18. Show how these values could be calculated.

8. Suppose you had an investment of $10,000 which earned an annual return of 6% compounded continuously for 18 years. How many semesters of the college you want to attend could you pay for? Justify with clear and complete work.

9. Suppose you had the choice of doubling the time or doubling the amount of the initial investment in the problem above. Which would end up with a greater total? By how much? Make a guess before you do any calculating.

10. What else would you like to learn about the ideas in this activity?