Name: _____ Date: _____

5-10 COMPOUND INTEREST
MATH III HOMEWORK

APPLICATIONS

1. The value of an initial investment of \$400 at 3% nominal interest compounded quarterly can be modeled using which of the following equations, where t is the number of years since the investment was made?

   (1) $A = 400(1.0075)^{4t}$ (3) $A = 400(1.03)^{4t}$

   (2) $A = 400(1.0075)^{t}$ (4) $A = 400(1.0303)^{4t}$

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2. Which of the following represents the value of an investment with a principal of \$1500 with a nominal interest rate of 2.5% compounded monthly after 5 years?

   (1) \$1,697.11 (3) \$4,178.22

   (2) \$1,699.50 (4) \$5,168.71

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3. Franco invests \$4,500 in an account that earns a 3.8% nominal interest rate compounded continuously. If he withdraws the profit from the investment after 5 years, how much has he earned on his investment?

   (1) \$858.92 (3) \$922.50

   (2) \$912.59 (4) \$941.62

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4. An investment that returns a nominal 4.2% yearly rate, but is compounded quarterly, has an effective yearly rate closest to

   (1) 4.21% (3) 4.27%

   (2) 4.24% (4) 4.32%

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5. If an investment's value can be modeled with $A = 325\left(1+\frac{.027}{12}\right)^{12t}$ then which of the following describes the investment?

   (1) The investment has a nominal rate of 27% compounded every 12 years.
   (2) The investment has a nominal rate of 2.7% compounded every 12 years.
   (3) The investment has a nominal rate of 27% compounded 12 times per year.
   (4) The investment has a nominal rate of 2.7% compounded 12 times per year.

   _____

6. An investment of \$500 is made at 2.8% nominal interest compounded quarterly.

   (a) Write an equation that models the amount A the investment is worth t-years after the principal has been invested.

   (b) How much is the investment worth after 10 years?

   (c) Algebraically determine the number of years it will take for the investment to be reach a worth of \$800. Round to the nearest *hundredth*.

   (d) Why does it make more sense to round your answer in (c) to the nearest quarter? State the final answer rounded to the nearest quarter.

REASONING

7. The formula $A = P\left(1+\frac{r}{n}\right)^{nt}$ can be rearranged using properties of exponents as $A = P\left(\left(1+\frac{r}{n}\right)^{n}\right)^{t}$. Explain what the term $\left(1+\frac{r}{n}\right)^{n}$ helps to calculate.

8. The formula $A = Pe^{rt}$ calculates the amount an investment earning a nominal rate of r compounded continuously is worth. Show that the amount of time it takes for the investment to double in value is given by the expression $\frac{\ln 2}{r}$.