Name: _____ Date: _____
Math 110

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Quiz 2 – Exponential Functions

Show all work for full credit!!! Round all answers to 2 decimal places.

1. **(13 pts)** Suppose that a stock's price is rising at the rate of 6% per year, and that it continues to increase at this rate. Right now, one share of this stock is $57.
   a. Write an equation that represents the value of the stock, where *t* represents years.

   b. Estimate the value of one share of the stock in 3 years.

   c. When will on share of the stock be worth $100?

   d. Sketch a graph. Find the horizontal asymptote, *x*-intercept, and *y*-intercept.

2. **(2 pts)** The average rent for a one-bedroom apartment in Providence can be modeled by $R(t) = 2045(1.028)^t$, where $R(t)$ is the rent in dollars and $t = 0$ represents the year 2023.
   a. What was the average rent in 2023?

   b. Is the rent increasing or decreasing? By what percentage?

3. **(8 pts)** $18,000 is placed into an account that earns 2.5% interest continuously compounded.
   a. How much will be in the account after 5 years?

   b. How much interest is earned in those 5 years?

   c. How long will it take for the investment to double?

4. (12 pts) A company's total cost, in millions of dollars, can be modeled by $C(x) = -50e^{-0.23t} + 150$, where *t* is the time in years since the start-up date.

a. Sketch a graph. Find the horizontal asymptote, *x*-intercept, and *y*-intercept.

b. Interpret the meaning of the *y*-intercept.

c. Interpret the meaning of the horizontal asymptote.

d. When will the company's total cost be at $120 million?

5. **(8 pts)** To save for a child's college education, parents deposit $8,000 one time into an account that pays 3.75% annual interest compounded daily.
    a. What will the value of the investment be in 18 years?

    b. How much interest will be earned in 18 years?

    c. How long will it take for the investment to reach $20,000?

6. **(4 pts)** How much money must be initially deposited into an account with 2.7% interest compounded monthly if you want to have $12,000 in 6 years?

7. **(3 pts)** What interest rate will allow $9000 to grow to $15,000 in 9 years if interest is compounded quarterly?

****BONUS (5 pts) ****

Given the supply function $p = 20(1.1)^{\frac{q}{10}}$ and the demand function $p = 50(0.95)^{\frac{q}{10}}$, find the equilibrium point.