1. a) A bank pays 6% interest, compounded quarterly. If a person presently has $2000 in the bank, how long would it take until there is $2800 in the account?

b) If the bank compounded the interest daily, how long would it take the person from part (a) to get his $2800?

c) A different bank pays 5¾% interest, compounded continuously. If a person presently has $2000 in the bank, how long would it take until there is $2800 in the account?

2. Solve each equation below *exactly*: A calculator solution will receive NO CREDIT.
   a. \(4(1.34)^t = 2^t\)

   b. Solve the equation, for exact values of \(\theta\) if possible, \(0 \leq \theta < 2\pi\).
   \(2 \cos^2\theta = \sin \theta + 1\)

   c. \(\ln(x - 3) + \ln(x - 2) = \ln(2)\)

3. The decay of the radioactive isotope carbon-14 can be modeled by \(Q = Q_0 e^{-0.00012t}\). How long will it take for any sample of carbon-14 to be reduced by 90% of its initial amount. *Round your answer to the nearest year.*

4. a) Find a possible formula, \(f(x)\), to represent the graph of this parabola.

   b) Find the average rate of change for this parabola on the interval \(-2 \leq x \leq 2\).

   c) Is this function invertible on a domain of all real numbers?

   c) Evaluate \(f^{-1}(-1)\)
5. Given: \( y = \frac{2x^2 - 18}{x^2 - 2x - 8} \)

a) Find each of the following, and explain how you obtained your answer. (It is not acceptable to state that you looked at the calculator’s graph).

i) vertical asymptote(s)

ii) horizontal asymptote(s)

iii) x-intercept

iv) y-intercept

v) hole (if any)

b) Sketch a graph of the function, utilizing the information obtained in part (a). Be sure to indicate the asymptotes and intercepts.

6. Refer to the table given below:

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>2000</td>
<td>1000</td>
<td>500</td>
<td>250</td>
<td>125</td>
</tr>
</tbody>
</table>

a) Determine whether \( f \) is linear, exponential, or neither. Explain. (Do NOT refer to the correlation coefficient in your explanation.)

b) Find a formula for the function \( f(x) \).