NAME:

MATH133 Unit 5 Individual Project – B

1) Find the domain of the following:

a) \( f(t) = 4.5e^t \)

**Answer:**

**Explain how you obtained your answer here:**

b) \( g(x) = \log(x + 3) \)

**Answer:**

**Show your work or explain how you obtained your answer here:**

c) \( g(x) = 2^x \)

**Answer:**

**Explain how you obtained your answer here:**

d) \( g(t) = \ln(t - 1) \)

**Answer:**

**Show your work or explain how you obtained your answer here:**

2) Describe the transformations on the following graph of \( f(x) = e^x \). State the placement of the horizontal asymptote and \( y \)-intercept after the transformation. For example, *horizontal shift to the left 1* or *reflected about the y-axis* are descriptions.
a) \( g(x) = e^x - 4 \)

Description of transformation:

Equation(s) for the Horizontal Asymptote(s):

\( y \)-intercept in \((x, y)\) form

b) \( h(x) = -e^x \)

Description of transformation:

Equation(s) for the Horizontal Asymptote(s):

\( y \)-intercept in \((x,y)\) form:
3) The number of cell phones in use in the United States is increasing exponentially. The number \( N \), in millions, in use can be estimated by

\[ N(t) = 7.12 \cdot (1.3)^t \]

(also can be written as \( N(t) = 7.12(1.3)^t \))

where \( t \) is the number of years after 1990.

a) To estimate the number of cell phones in use in 1995, in 2005, and in 2010, fill in the following table

<table>
<thead>
<tr>
<th>year</th>
<th>( t )</th>
<th>( N(t) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Show your work in this space:

b) Graph the function.

Answer:
4) Suppose that the function \( P = 13 + 45 \ln x \) represents the percentage of inbound e-mail in the U.S. that is considered spam, where \( x \) is the number of years after 2000.

**Carry all calculations to six decimals on each intermediate step when necessary.**

a) Use this model to determine the percentage of spam in the year 2003. **Round your answer to two decimals places.**

Answer:

Show your work in this space:

b) Use this model to determine in how many years (to two decimal places) it will take for the percent of spam to reach 95% provided that law enforcement regarding spammers does not change. **Round your answer to two decimal places.**

Answer:

Show your work in this space: