1. Imani must check and adjust the pH level of her swimming pool each week. A pH level of 7.4 is considered ideal. If the pH level is above 7.6, the pool is too alkaline and Imani must add sodium bisulfate to lower the pH level. The amount of sodium bisulfate $A$ that Imani must add is a function of the pH level $p$. The table below relates $A$ to $p$.

<table>
<thead>
<tr>
<th>$P$ (pH level)</th>
<th>$A$ (oz per 1000 gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 7.2 to below 7.6</td>
<td>None</td>
</tr>
<tr>
<td>From 7.6 to below 7.8</td>
<td>0.5</td>
</tr>
<tr>
<td>From 7.8 to below 8.0</td>
<td>1.0</td>
</tr>
<tr>
<td>From 8.0 to below 8.4</td>
<td>2.0</td>
</tr>
<tr>
<td>8.4</td>
<td>2.4</td>
</tr>
</tbody>
</table>

A. Evaluate $A(8.0)$ and then interpret this value using a complete sentence.

B. Express the following information in function notation: Imani must add one-half ounce of sodium bisulfate per 1,000 gallons of water if the pH level is 7.6

C. What is the domain of the function $A$?

D. What is the range of function $A$?

E. Show 0 is in the range by finding an input $p$ such that $A(p) = 0$.

F. Explain why 1.5 is not in the range of $A$.

G. Is it correct to write $A(7.0) = 0$? Why or why not?
2. A biologist is monitoring a population of fruit flies in an experiment. The number \( N \) of fruit flies in the population after \( t \) days of the experiment is given by the function

\[
N(t) = -2(t + 10)(t - 20).
\]

A. Evaluate \( N(0) \) and then interpret this value using a complete sentence.

B. What is the population of fruit flies after 5 days of the experiment? Express the following information in function notation.

C. Is \(-5\) in the abstract domain of the function \( N \)?

D. Is the value \( N(-5) \) meaningful? Explain.

E. At what time(s) is the fruit fly population 216? Express this information using function notation.

F. Use part E to explain why 216 is in the range of function \( N \).

G. When does the fruit fly population become extinct?

H. Use part G to write the application domain of function \( N \). Use interval notation
3. The following graph depicts the daily sales $S$ (in thousands of dollars) of Granny Green’s Chocolate Bars, $m$ months after a new advertising campaign is started.

A. Evaluate $S(4)$ and then interpret this value using a complete sentence.

B. What are the daily sales 9 months after the advertising campaign begins. Express the following information in function notation.

C. How long after the advertising campaign begins do daily sales reach $1000$?

D. Show 4 is in the range of function $S$ by finding an input $m$ such that $S(m) = 4$.

E. Is the value $S(0)$ meaningful? Explain.

F. Is the value $S(12)$ meaningful? Explain.

G. Is 5 in the range of $S$?

H. Write the domain of the function $S$.

I. The graph of $S$ has a horizontal asymptote of $y=5$. What does this asymptote suggest about the trend in daily sales?
4. The graph of \( y = f(x) \) passes through the points \((0, 1), (1, 2), \) and \((2, 3)\). Find the corresponding points on the graph of \( y = f(x + 2) - 1 \).

5. The graph of the function \( g \) with the symbol rule \( g(x) = \frac{-6 - x}{2} \) is shown. Each of the three points plotted in the figure is contained on the graph of function \( g \), but only the output of the coordinate is shown. Find the input coordinate of each point.

6. a) Consider \( f(x) = \sqrt{x - 1} \) and \( g(x) = \frac{1}{\sqrt{x - 1}} \). Why are the domains different?

   b) Consider \( f(x) = \sqrt{x - 2} \) and \( g(x) = \sqrt[3]{x - 2} \). Why are the domains different?