Limits

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

1. Consider $f(x) = \frac{2x^2 + 4x}{x + 2}$.

   (a) Fill in the following table:

<table>
<thead>
<tr>
<th>$x$</th>
<th>-3</th>
<th>-2.1</th>
<th>-2.01</th>
<th>-2</th>
<th>-1.99</th>
<th>-1.9</th>
<th>-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f(x)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   (b) Use the data above to find $\lim_{x \to -2} f(x)$.

   (c) Draw the graph of $f$ on the axis below and verify your answer.
2. Let \( g \) be the piece-wise defined function below. This means the graph of \( g \) is the entire dotted graph shown below.

(a) Find the following if it exists:
\[
\lim_{x \to 1} g(x) \quad \lim_{x \to 0} g(x) \quad \lim_{x \to 3} g(x)
\]
\[
\lim_{x \to 2} g(x) \quad \lim_{x \to -2} g(x) \quad \lim_{x \to -3} g(x)
\]

3. Sketch a graph of a function \( \alpha \) that satisfies all of the following:
\[\alpha(-1) = 2, \quad \lim_{x \to -1} \alpha(x) = -3, \quad \lim_{x \to 2} \alpha(x) = -3, \quad \text{and the } \lim_{x \to 4} \alpha(x) \text{ does not exist.}\]