Directions: Estimate and then solve each problem. Model the problem with a tape diagram. Explain if your answer is reasonable.

1. For the bake sale, Connie baked 144 cookies. Esther baked 49 more cookies than Connie.
   a. About how many cookies did Connie and Esther bake? Estimate by rounding each number to the nearest ten before adding.
      \[\begin{array}{c}
      144 \approx 140 \\
      49 \approx 50 \\
      \end{array}\]
      \[\begin{array}{c}
      140 \\
      + 50 \\
      \hline
      190 \\
      \hline
      190 \\
      + 140 \\
      \hline
      330 \\
      \end{array}\]
      Esther baked about 190 cookies.
      Connie and Esther baked about 330 cookies.
   b. Exactly how many cookies did Connie and Esther bake?
      \[\begin{array}{c}
      144 \\
      + 49 \\
      \hline
      193 \\
      \hline
      193 \\
      + 144 \\
      \hline
      337 \\
      \end{array}\]
      Esther baked 193 cookies.
      Connie and Esther baked 337 cookies.
   c. Is your answer reasonable? Compare your estimate from (a) to your answer from (b). Write a sentence to explain your reasoning.
      Yes, my answer is reasonable. I estimated that Connie and Esther baked 330 cookies. If I round my actual answer, 337, to the nearest tens place, I get 340, which is very close to 330.
2. Raffle tickets were sold for a school fundraiser to parents, teachers and students. 563 tickets were sold to teachers. 888 more tickets were sold to students than to teachers. 904 tickets were sold to parents.

How many tickets were sold to parents, teachers, and students?

a. About how many tickets were sold to parents, teachers, and students? Round each number to the nearest hundred to find your estimate.

\[
\begin{align*}
563 & \approx 600 \text{ to teachers} \\
888 & \approx 900 + 600 = 1500 \text{ to students} \\
904 & \approx 900 \text{ to parents}
\end{align*}
\]

About 3,000 tickets were sold to parents, teachers, and students.

b. Exactly how many tickets were sold to parents, teachers, and students?

\[
\begin{align*}
563 & + 888 \\
+ 904 & \\
\hline
2,918 &
\end{align*}
\]

2,918 tickets were sold to parents, teachers, and students.

c. Assess the reasonableness of your answer in (b). Use your estimate from (a) to explain.

My answer of 2,918 is reasonable because 2,918 rounded to the nearest thousand is 3,000 which was my estimate.

3. From 2010 to 2011, the population of Queens increased by 16,075. Brooklyn’s population increased by 11,870 more than the population increase of Queens.

a. Estimate the total combined population increase of Queens and Brooklyn from 2010 to 2011. (Round the addends to estimate.)

\[
\begin{align*}
16,075 & \approx 16,000 \\
11,870 & \approx 12,000 \\
\hline
28,000 &
\end{align*}
\]

The total combined population increase is about 28,000.
b. Find the actual total combined population increase of Queens and Brooklyn from 2010-2011.

\[
\begin{array}{c}
16,075 \\
+ 11,870 \\
\hline
27,945
\end{array}
\]

The actual total combined population increase was 27,945.

c. Assess the reasonableness of your answer in (b). Use your estimate from (a) to explain.

My answer of 27,945 is reasonable because 27,945 rounded to the nearest thousand is 28,000 which was my estimate.

4. During National Recycling Month, Mr. Yardley's class spent 4 weeks collecting empty cans to recycle.

<table>
<thead>
<tr>
<th>Week</th>
<th>Number of Cans Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10,827</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10,522</td>
</tr>
<tr>
<td>4</td>
<td>20,011</td>
</tr>
</tbody>
</table>

a. During Week Two, the class collected 1,256 more cans than they did during Week One. Determine the final count of cans collected by Mr. Yardley's class at the end of the 4 weeks.

\[
\begin{array}{c}
10,827 \\
+ 1,256 \\
\hline
12,083
\end{array}
\]

At the end of 4 weeks, Mr. Yardley's class collected 53,443 cans.

b. Assess the reasonableness of your answer in part a by estimating the total number of cans collected.

\[
\begin{array}{c}
10,827 \approx 11,000 \\
12,083 \approx 12,000 \\
10,522 \approx 11,000 \\
20,011 \approx 20,000
\end{array}
\]

My answer of 53,443 is close to 54,000 so it is reasonable.