In a recent survey, consumers were asked where they did their gift shopping. The following results were obtained: 1327 shopped at Macy's, 819 shopped at Emporium, 1263 shopped at Nordstrom. 1747 shopped at Emporium or Nordstrom, 2204 shopped at Macy's or Nordstrom, 1742 shopped at Macy's or Emporium, 223 shopped at all three, 139 shopped at neither Macy's nor Emporium nor Nordstrom.

\[
\begin{align*}
\text{Macy's} & : 1327 \quad -181 \quad -223 \quad -163 \quad 760 \\
\text{Emporium} & : 819 \quad -181 \quad -223 \quad -112 \quad 303 \\
\text{Nordstrom} & : 1263 \quad -112 \quad -223 \quad -163 \quad 765 \\
\end{align*}
\]

\[
\begin{align*}
n(\text{Macy's or Emporium}) &= n(\text{Macy's}) + n(\text{Emporium}) - n(\text{Macy's and Emporium}) \\
1742 &= 1327 + 819 - x \quad \text{(combine numbers on right)} \\
1742 &= 2146 - x \quad \text{(add } x \text{ to both sides)} \\
1742 + x &= 2146 \quad \text{(subtract 1742 from both sides)} \\
x &= 404 - \text{This is the number of people in the overlap of green and blue circles.}
\end{align*}
\]

\[
\begin{align*}
n(\text{Macy's or Nordstrom}) &= n(\text{Macy's}) + n(\text{Nordstrom}) - n(\text{Macy's and Nordstrom}) \\
2204 &= 1327 + 1263 - y \quad \text{(combine numbers on right)} \\
2204 &= 2590 - y \quad \text{(add } y \text{ to both sides)} \\
2204 + y &= 2590 \quad \text{(subtract 1742 from both sides)} \\
y &= 386 - \text{This is the number of people in the overlap of green and red circles.}
\end{align*}
\]
\[ n(\text{Nordstrom or Emporium}) = n(\text{Nordstrom}) + n(\text{Emporium}) - n(\text{Nordstrom and Emporium}) \]
\[ 1747 = 1263 + 819 - z \text{ (combine numbers on right)} \]
\[ 1747 = 2082 - z \text{ (add y to both sides)} \]
\[ 1747 + z = 2082 \text{ (subtract 1742 from both sides)} \]
\[ z = 335 \text{ – This is the number of people in the overlap of green and red circles.} \]