3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield for one tree if 35 trees were planted? If 36 trees were planted? If 37 trees were planted?

<table>
<thead>
<tr>
<th>n</th>
<th>t (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>150</td>
</tr>
<tr>
<td>36</td>
<td>148</td>
</tr>
<tr>
<td>37</td>
<td>146</td>
</tr>
</tbody>
</table>

\[
\frac{\Delta t}{\Delta n} = -2 \text{ lbs/tree}
\]

\[
t - 150 = -2(n - 35)
\]

\[
t = -2n + 70 + 150
\]

OR

\[
t = -2n + 220
\]

b) What would be the total yield per acre if 35 trees were planted? If 36 trees were planted? If 37 trees were planted? Organize your results in a table.

<table>
<thead>
<tr>
<th>n</th>
<th>t</th>
<th>y = total yield (lbs)</th>
<th>total yield increases because each tree makes less, there are more trees in one acre.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>150</td>
<td>(35)(150) = 5250</td>
<td>tree 150 less for every 1 lb tree over 35/lbs</td>
</tr>
<tr>
<td>36</td>
<td>148</td>
<td>(36)(148) = 5328</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>146</td>
<td>(37)(146) = 5402</td>
<td></td>
</tr>
</tbody>
</table>

\[
t = 150 - 2(n - 35)
\]

\[
t = -2n + 70 + 150
\]

\[
t = -2n + 220
\]

\[
t = 5402 \text{ lbs}
\]

\[
f(x) = 220(55) - 2(55)^2
\]

\[
f(55) = 220(55) - 2(55)^2
\]

\[
f(55) = 6050 \text{ lbs/acre}
\]

\[
f(37) = 220(37) - 2(37)^2
\]

\[
f(37) = 7400 - 2738
\]

\[
f(37) = 5402 \text{ lbs}
\]

\[
\text{Plant 55 trees to maximize yield}
\]

\[\text{Total yield decreases after 55 trees because the loss in yield per tree counters the gain in trees.}\]