Write the constraints and objective function for each word problem. Label both \( x \) and \( y \). DO NOT SOLVE.

1. Mrs. Smith grows peaches and apples. At least 500 peaches and 700 apples must be picked daily to meet minimum demands from the buyers. The workers can pick no more than 1200 apples and 1400 peaches daily. The combined number of peaches and apples that the packaging department can handle is 2300 per day. If Mrs. Smith sells her apples at 25 cents each and peaches at 20 cents each, how many of each should be picked daily for maximum income? What is her maximum income? 

\[
\begin{align*}
\text{\# of peaches} & & \text{\# of apples} \\
x & & y \\
\geq & & \geq \\
500 & & 700 \\
\leq & & \leq \\
1200 & & 1400 \\
f(x, y) = 0.20x + 0.25y
\end{align*}
\]

2. Mr. Beauregard raises only pigs and goats, and this year he intends to raise 16 animals. There is plenty of room in the pigpen, but a lack of space limits the number of goats to 12. One other limitation is money, it costs $5 a day to raise a pig and $2 a day to raise a goat, and Mr. Beauregard can spend only $50 a day on the animals. If Mr. Beauregard can make a profit of $17.50 per goat and $14.00 per pig, how many of each should he raise to maximize his profit? What is his maximum profit?

\[
\begin{align*}
\text{\# of pigs} & & \text{\# of goats} \\
x & & y \\
\leq & & \leq \\
16 & & 12 \\
5x + 2y & & \leq 50 \\
x & & y \\
\geq & & \geq \\
0 & & 0 \\
f(x, y) = 14x + 17.5y
\end{align*}
\]

3. The Algebra 2 quiz consists of computation problems and graphing problems. Computation problems are worth 6 points each and graphing problems are worth 10 points each. You can answer a computation problem in 2 minutes and a graphing problem in 4 minutes. You have forty minutes to take the quiz and may choose no more than 12 problems to answer. Assuming you answer all the problems attempted correctly, how many of each type should you answer to get the highest score?

\[
\begin{align*}
\text{computation prob.} & & \text{graphing prob.} \\
x & & y \\
2x + 4y & & \leq 40 \\
x + y & & \leq 12 \\
x & & y \\
\geq & & \geq \\
0 & & 0 \\
f(x, y) = 6x + 10y
\end{align*}
\]

4. A carpentry shop makes dinner tables and coffee tables. Each week the shop must complete at least 9 dinner tables and 13 coffee tables to be shipped to furniture stores. They shop can produce at most 30 dinner tables and coffee tables altogether each week. If the shop sells dinner tables for $120 and coffee tables for $150, how many of each item should be produced for a maximum weekly income?

\[
\begin{align*}
\text{dinner tables} & & \text{coffee tables} \\
x & & y \\
\geq & & \geq \\
9 & & 13 \\
x + y & & \leq 30 \\
f(x, y) = 120x + 150y
\end{align*}
\]
5. TeeVee, Inc. makes LCD and plasma televisions. The equipment in the factory allows for making at most 450 LCD televisions and 200 plasma televisions in one month. The chart below shows the cost of making each type of television and the profit. During the month of November, the company can spend $360,000 to make these televisions. To maximize profit, how many of each type should they make?

\[
x = \# \text{ of LCD TVs} \quad y \leq 450
\]
\[
y = \# \text{ of Plasma TVs} \quad y \leq 200
\]
\[
600x + 900y \leq 360,000
\]
\[
f(x,y) = 125x + 200y
\]

<table>
<thead>
<tr>
<th>Television</th>
<th>Cost per unit</th>
<th>Profit per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD</td>
<td>$600</td>
<td>$125</td>
</tr>
<tr>
<td>Plasma</td>
<td>$900</td>
<td>$200</td>
</tr>
</tbody>
</table>

6. Oaken Treasures makes two different kinds of chairs, rockers and swivels. Work on machines A and B is required to make both kinds. Machine A can be run no more than 20 hours a day. Machine B is limited to 15 hours a day. The following chart shows the amount of time on each machine that is required to make one chair. The profit made on each chair is also shown. How many chairs of each kind should Oaken Treasures make each day to maximize their profit?

\[
x = \text{Rockers} \quad 2x + 4y \leq 20
\]
\[
y = \text{Swivels} \quad 3x + 1y \leq 15
\]
\[
x \geq 0
\]
\[
y \geq 0
\]
\[
f(x,y) = 12x + 10y
\]

<table>
<thead>
<tr>
<th>Chair</th>
<th>Operation A</th>
<th>Operation B</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocker</td>
<td>2 hours</td>
<td>3 hours</td>
<td>$12</td>
</tr>
<tr>
<td>Swivel</td>
<td>4 hours</td>
<td>1 hour</td>
<td>$10</td>
</tr>
</tbody>
</table>

7. A theater where a drug abuse program is being presented seats 150 people. The proceeds will be donated to a local drug information center. Admission is $2 for adults and $1 for students. Every two adults must bring at least one student. How many adults and students should attend in order to raise the maximum amount of money?

\[
x = \# \text{of adults} \quad x + y \leq 150
\]
\[
\frac{1}{2}x \leq y
\]
\[
x \geq 0
\]
\[
y \geq 0
\]
\[
f(x,y) = 2x + y
\]

8. A farmer has 20 days in which to plant corn and soybeans. The corn can be planted at a rate of 10 acres per day and the soybeans at a rate of 15 acres per day. The farm has 250 acres available for planting. If the profit on corn is $30 per acre, and the profit on soybeans is $25 per acre, how much of each should the farmer plant for maximum profit?

\[
x = \text{acres of corn} \quad x + y \leq 250
\]
\[
y = \text{acres of soybeans} \quad \frac{x}{10} + \frac{y}{15} \leq 20
\]
\[
x \geq 0
\]
\[
y \geq 0
\]
\[
f(x,y) = 30x + 25y
\]