Unit 4, Lesson 6

# Modeling Constraints

Let's represent some situations from banking and insurance.

## 6.1 Notice and Wonder: The Wonderful World of Finance

What do you notice? What do you wonder?

1. Jada received $100 on her birthday. She has a savings account and a checking account that she can deposit the money in.

2. Han's uncle is an insurance agent. He sells customers two types of car insurance policies: one with minimum coverage and one with full coverage. The minimum coverage insurance costs $1,000 each year, and the full coverage one costs $4,000 each year. His goal for the year is to sell policies costing over $100,000 total.

# 6.2 Insurance Policies

Han's uncle is an insurance agent. He sells customers two types of car insurance policies: one with minimum coverage and one with full coverage. The minimum coverage insurance costs $1,000 each year and the full coverage one costs $4,000 each year. His goal for the year is to sell policies costing over $100,000 total.

1. List some different amounts of each policy Han's uncle could sell.

2. What calculations could you do to check whether Han's uncle reached his goal?

3. What could you compare your answers to, to see if he reached the goal?

4. Complete the table using the values from the earlier questions.

| number of minimum coverage policies sold | number of full coverage policies sold | calculation | check |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| $x$ | $y$ | | |

5. Write an inequality using the number of minimum coverage policies, $x$, and the number of full coverage policies, $y$. The inequality should be true if Han's uncle meets his goal.

# 6.3 Row Game: Writing Inequalities from Situations

Your teacher will assign you a set. Work only on the problems in your set. Work on one question at a time, and check whether your answer matches your partner's before moving on.

Set A

1. Clare has $25.00 to spend on souvenirs during her class trip to Washington, D.C. She wants to buy some souvenirs from the Air & Space Museum and some from the National Museum of African American History and Culture. She might not spend all of her money. Let $x$ represent the amount of money she spends at Air & Space and $y$ represent the amount of money she spends at the African American museum.
   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows what Clare can spend on souvenirs.

2. Diego is moving and needs to pack his books and games. His boxes of books weigh 10 pounds each. His boxes of games weigh 2 pounds each. Diego can move no more than 50 pounds of boxes at a time. Let $x$ represent the number of boxes of books and $y$ represent the number of boxes of games.
   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how boxes of books and games Diego can move at one time.

3. The band is raising money for their trip to Orlando. Each student needs to raise at least $250. They are selling candles that earn $7 each, and poinsettias that earn $15 each.
   Let $x$ represent the number of candles sold and $y$ represent the number of poinsettias sold.
   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many candles and poinsettias each student needs to sell.

4. Mai is trying to earn at least $75 toward prom-related expenses. Her mom has offered to pay her $3.00 every time she cleans the cat litter, and $5.00 every time she walks the dog. Let $x$ represent the number of times she cleans the cat litter and $y$ represent the number of times she walks the dog.
   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many times Mai could walk the dog and clean the cat litter to meet her goal.

Set B

1. Lin's library sets a maximum of 25 items that can be checked out at one time. Lin likes to check out books and DVDs. Let $x$ represent the number of books Lin checks out, and $y$ represent the number of DVDs Lin checks out.
   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many books and DVDs Lin can check out.

2. Noah is sending a care package to his cousin in the military. He has saved $50 to spend. His cousin's favorite items are movies, which Noah found on sale for $10 each, and comic books, which are $2 each. Let $x$ represent the number of movies Noah buys, and $y$ represent the number of comic books. Noah doesn't have to spend all of the money on this care package.

   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many movies and comic books Noah can send his cousin.

3. A group of teachers is ordering school supplies online. They need pencils, which are $7 a box, and paper, which is $15 a box. They get free shipping on orders of $250 or more. Let $x$ represent the number of boxes of pencils they buy, and $y$ represent the number of boxes of paper they buy.

   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many boxes of pencils and paper the teachers could buy to get free shipping.

4. Priya is helping her cousins at their farm stand. Her aunt has asked them to try to sell at least 75 pounds of tomatoes by noon. They sell tomatoes in 3-pound and 5-pound bags. Let $x$ represent the number of 3-pound bags of tomatoes they sell and $y$ represent the number of 5-pound bags they sell.

   a. What is one ordered pair $(x, y)$ that will work in this situation?

   b. Write an inequality in terms of $x$ and $y$ that shows how many 3-pound bags and 5-pound bags Priya and her cousins could sell to meet the goal.