**3.5 Modelling with Algebra**

**Minds-On**

Try this with a friend (or family member if at home). You might want a calculator handy.

Ask them to pick a number from 1 to 10 and write it down. Make sure you can not see the number they wrote down.

Instruct them to do the following with the number:

* Take the number and double it
* Add 50
* Triple the result
* Subtract 100
* Divide the value in half

Have them tell you their final answer.

From the answer they gave you,

* Subtract 25
* Divide by 3

The answer you have should be the same number they started with.

Play the game again with a different number as your starting value.

Why does this work?

**Example 1:**

Murray runs a variety store with his two sons Derek and Kyle.

* Derek makes twice as much as Kyle, who only works part-time.
* Murray pays himself $200 per week more than Derek makes
* The total weekly payroll is $1450.

How much does each family member earn per week?

**Example 2:**

Kyle (from question 1), also works at a ballpark, selling peanuts. He is paid $6/h plus 50 cents commission for every bag of peanuts he sells.

1. Find Kyle’s earnings if he sells 42 bags of peanuts during a 4-h shift.
2. How many bags of peanuts must he sell to earn $100 in a 7 hour shift?

**Example 3:**

Ms. Kuhl is building a Japanese rock garden in the shape of a right triangle in a corner of her yard. She wants the second-shortest side to be twice as long as the shortest side. She wants the area of the garden to be 30 m2. What are the three side lengths of the garden to the nearest tenth? (Hint: you may need to use the Pythagorean Theorem.)

**Practice:**

1. Write an equation to represent each sentence.
   1. Five times a number is 85
   2. An area increased by 8 is 177
   3. Three more than double a number is 33
   4. The sum of three consecutive integers is 168
2. Solve each equation in #1.
3. Two friends are collecting pop-can tabs. Owen has 250 more pop-can tabs than Harmony. Together they have collected 880 pop-can tabs. How many pop-can tabs has each friend collected?
4. Trinity is 4 years older than her sister, Dora. The sum of their ages is 30. How are the sisters?
5. Jack is selling used computers. He is paid $15/h plus a 5% commission on sales. What dollar amount of computer sales must Jack make to earn $1000 in a 40-h work week?
6. The sum of three consecutive number is 120. Find the numbers.
7. A circular garden has a diameter of 12m. By how much should the diameter be increased to triple the area of the garden?