C3 - Model a Situation

Create a system of linear equations to model a given situation.

Solve problems involving a model system of linear equations.

Model a Situation #1

Create a system of linear equations to model the situation below.

People can rent ski and snowboard equipment from two places at Winterland Resort.
When will each option be the better choice?

Option A charges a one-time $30 fee and then $8 per hour.
Option B charges $14 per hour.

MHR pg. 434

Assign Variables

c = cost ($)

h = # of hours

Make System

Option A: $c = 8h + 30$

Option B: $c = 14h$

Model a Situation #2

Create a system of linear equations to model the situation below.

Two hopper-bottom grain bins are being emptied starting at the same time.
- The larger bin holds 45 m^3 of grain. It is emptied at a rate of 1 m^3 per minute.
- The smaller bin stores 30 m^3 of grain. This bin is emptied at a rate of 0.5 m^3 per minute.

Model the volume of grain remaining as a function of time using a system of linear equations. When will the two bins have the same amount of grain?

MHR pg. 436

Assign Variables

V = volume (m^3)

t = time (min)

Make System

Larger $V = 45 - t$

Smaller $V = 30 - \frac{1}{2}t$

Model a Situation #3

Create a system of linear equations to model the situation below.

A movie theatre charges $11 for an adult ticket and $8 for children's or seniors' tickets. Suppose 240 people attended the early movie and ticket sales totalled $2370.

a) The box office manager wants to know how many adults attended the early movie. What system of linear equations could help the manager determine the answer?

MHR pg. 438

Assign Variables

a = # of adults

o = # of other tickets (children / seniors)

Make System

# of people $a + o = 240$

ticket sales $11a + 8o = 2370$

Model a Situation #4

Create a system of linear equations to model the situation below.

A parachutist descends from a height of 500 m to 300 m above the ground in 50 s. During the same time, a balloonist rises from 200 m to 500 m. When are the parachutist and balloonist at the same height?

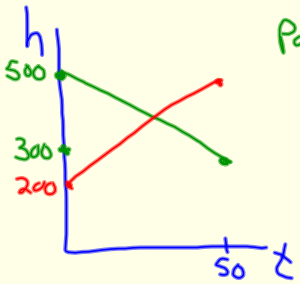
MHR pg. 444

Assign Variables

h = height (m)

t = time (s)

Make System



Parachutist → $y = mx + b$

$h = \frac{-200}{50}x + 500$

$\boxed{h = -4x + 500}$

Balloonist → $y = mx + b$

$h = \frac{300}{50}x + 200$

$\boxed{h = 6x + 200}$

Model a Situation

When given a situation the following steps should be followed to create a system of linear equations:

Step #1 - Assign variables for the unknowns of the situation.

Step #2 - use the variables and the given information to create two linear equations.

Practice: C3 Assignment #1

Shower vs. Bath (Board Work)

http://threeacts.mrmeyer.com/showervbath/

Act One: Shower vs. Bath Video

What interests you about this video?
What would you like to find out?

Which one uses more water? How much more?

Act Two: What information will you need to know to solve the problem?

Video 1 Video 2

Act Three: The sequel

Grid on back of Concept Asgn may help.

How long of a shower can you take with the same amount of bath water.