Unit 4: Systems of Equations

In this unit we will solve problems involving:

- The **point of intersection** of a system of linear equations
- The **number of solutions** to a linear system
- Strategies for **solving** systems of linear equations **graphically and algebraically**

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Ch 8: Solving Systems of Linear Equations Graphically

In this chapter we will:

- create systems of linear equations and create graphs to **model situations**.
- **Solve** two-variable systems of linear equations **graphically**
- Explain what the **number of solutions** to a linear system mean.

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8.1 Systems of Linear Equations and Graphs

Recall: Relations can be represented numerically using a table of values, graphically and verified algebraically.

A **system of linear equations** is two or more linear equations involving common variables. It is often referred to as a **linear system**. It can be represented graphically in order to make comparisons or solve problems.

The **point of intersection** represents the **solution** to the system of linear systems. It is an ordered pair that **satisfies** both equations.

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Example: David earns $40 plus $10 an hour. Carmen earns $50 plus $8 an hour.

a) Represent the linear system relating the earnings numerically and graphically.

b) Identify the solution and explain what it represents.

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Example 2:

Consider the system of linear equations 2x+y=2 and x-y=7.

a) Identify the point of intersection of the lines.

b) Verify the solution algebraically.

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8.1 Continued - Word Problems

Lift passes for a ski trip are charged at two different rates; student and adult. One busload of 4 teachers and 34 students pays $428. A second busload of 3 teachers and 29 students pays $356. Write out this system of equations. What is the price for teacher and student lift passes?

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Hmwk: Pg 427 #3, 4, 5ac, 7ac, 8, 10, 11

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Homework: System of Linear Equations Worksheet

Due: Feb 29th - After Teacher's Convention

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8.2 Modelling and Solving Linear Systems

Example: People can rent ski and snowboard equipment from two places at Winterland Resort.

Option A charges a one-time $30 fee plus $8 an hour.

Option B charges $14 per hour.

a) Create a system of linear equations to model the charges.

b) Solve the system graphically. What does the solution represent?

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Example 2: Two pools start draining at the same time. The larger pool contains 54 675 L of water and drains at a constant rate of 25 L/min. The smaller pool contains 35 400 L of water and drains at a rate of 10 L/min.

a) Model the draining of the pools using a system of linear equations.

b) Represent the linear system graphically. Describe how the information shown in the graph relates to the pools.

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Hmwk: Pg 440 #2, 3, 4, 6, 7, 10, 14, 19

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8.3 Number of Solutions for Systems of Linear Equations

If we have two equations graphed on the same plane, what are the options for the number of intersections?

Hint: Remember parallel and perpendicular lines.

Hint: There are three options

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One Solution: Occurs when the two lines have different slopes.

No Solution: Occurs when the two lines are parallel.

Infinite Solutions: Occurs when the lines are identical. These lines are called **coincident lines**. These lines overlap completely.

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Predict and confirm the number of solutions of linear equations. Confirm each answer by graphing.

$$y = 2x - 3$$
$$y = \frac{1}{2}x + 3$$

$$4x + 10y = 30$$
$$2x + 5y = 35$$

$$10x - 6y = -12$$
$$21y = 42 + 35x$$

$$2x + 3y = 12$$
$$2x + 3y = 20$$

$$2x + 3y = 12$$
$$4x + 6y = 24$$

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Hmwk: Pg 455# 4, 5, 6, 8, 9, 10, 13, 17

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Ch 8 Review Online Quiz

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Ch 8 Review Online Quiz

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