Course: MFM2P Gr. 10 Applied   **Lesson: 5 - 4**

Unit: Linear Systems   **Topic: Solving Linear Systems by Elimination**

⚏ *homework check:* **Lesson 5 - 3**

⚏ *note:* **Solving Linear Systems by Elimination**

Another method for solving linear systems is elimination. Elimination uses either addition or subtraction to eliminate one of the variables. It may occasionally be necessary to multiply the equations first in order for the coefficients of the variables to be equal. For example, use elimination to solve the following systems.

a)
$$2x + 3y = 8$$
$$x - 2y = -3$$

In order to eliminate one of the variables, we need to

multiply equation two by 2 the x's have the same coefficient.

$$2x + 3y = 8$$
$$2x - 4y = -6$$

subtract both equations CAREFUL with INTEGER SIGNS

$$0x + 7y = 14$$

then solve

$$\frac{7y}{7} = \frac{14}{7}$$
$$y = 2$$

Substitute back into equation two to solve for x

$$x - 2(2) = -3$$
$$x - 4 = -3$$
$$x = -3 + 4$$
$$x = 1$$

Therefore, the point of intersection is $(1, 2)$

b) At Lisa's Sub Shop, two ham subs and four roast-beef subs cost $34. Five ham subs and six roast-beef subs cost $61. What is the cost of each sub?

Let the cost of a ham sub be represented by x.
Let the cost of a roast-beef sub be represented by y.

Write the equations represented by the information costs supplied.
$2x + 4y = 34$

$5x + 6y = 61$

If we wish to eliminate the x variable, we must multiply

equation one by 5 and equation two by 2

$10x + 20y = 170$

$10x + 12y = 122$

After subtracting these equations, we get

$0x + 8y = 48$

$\dfrac{8y}{8} = \dfrac{48}{8}$

$y = 6$

Now we can substitute back into equation one and solve for y.

$2x + 4(6) = 34$

$2x + 24 = 34$

$2x = 34 - 24$

$2x = 10$

$\dfrac{2x}{2} = \dfrac{10}{2}$

$x = 5$

Therefore, the cost of a ham sub is $5 and the cost of a roast-beef sub is $6.

⌗ *homework assignment:* **Lesson 5 - 4**

Lesson 5 – 4: Solving Systems using Elimination

**For each word problem, write a system of equations and solve using ELIMINATION.

1. School A uses 13 vans and 3 buses for 347 students. School B uses 6 vans and 9 buses for 579 students. How many students are in each van and each bus?

2. Shanna and Prim and selling pies. Shanna 2 cherry and 1 pumpkin for $30. Prim sells 1 cherry and 14 pumpkin for $258. What is the cost of a single cherry pie and a single pumpkin pie?

3. Ticket sales for the musical were sold over two days. Day one, 12 adult and 1 child ticket was sold for $80. Day two, 13 adult and 3 child tickets were sold for $102. What is the price of a single adult ticket and a single child ticket?

4. Julia and James wanted to improve the schoolyard. Julia bought 6 tulips and 14 geraniums for $78. James bought 12 tulips and 13 geraniums for $111. Find the price of each tulip plant and each geranium plant.

5. Jared and Courtney are selling wrapping paper for the school fundraiser. Jared sells 2 plain and 2 shiny rolls for $44 while Courtney sells 14 plain and 3 shiny rolls for $165. What is the cost of one roll of plain paper and one roll of shiny paper?

6. Each dancer sells tickets for the school dance competition. Anna sells 13 adult and 14 student tickets for $366. Cole sells 4 adult and 7 student tickets for $153. What is the single price of an adult ticket and a student ticket?

7. The schools are heading to an amusement park to study physics. School A fills 4 vans and 11 buses with 312 students. School B fills 12 vans and 2 buses with 192 students. How many students are in each bus and each van?

8. Molly and Natalie want to improve their homes. Molly buys 13 hosta plants and 1 shrub for $89. Natalie buys 3 hostas and 6 shrubs for $84. Find the cost of one hosta plant and one shrub.