Summary of Methods

1) **Substitution:** Requires that one of the variables be isolated on one side of the equation. It is especially convenient when one of the variables has a coefficient of 1 or -1.

2) **Elimination:** Can be applied to any system, but it is especially convenient when a variable appears in different equations with coefficients that are opposites.

3) **Graphing:** Can provide a useful method for estimating a solution.

What is the Best Method for the following?

1. $y = 4x - 3$
$5x - 2y = 6$

2. $4x - 5y = 13$
$2x + 5y = 5$

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

$y = -2x + 1$

What is the Best Method for the following?

4. $y = \frac{2}{3}x - 2$

$y = -x + 1$

5. 3x – 2y = 6

y = 2x – 4

6. x + y = 4

2x + 3y = 7

Skills Check

- Clear off your desk.
- Pencil and calculator only.
- Show all of your work.
- Circle your answer (check your answer if time permits).
- When you are finished sit quietly.

Solving Word Problems Using Systems

Steps

1. Define all variables.
2. Write the system of equations.
3. Solve using the best method & showing all steps.
4. State your solution in sentence form.
5. Check your solution.

1. You are selling tickets for a high school basketball game. Student tickets cost $3 and general admission tickets cost $5. You sell 350 tickets and collect $1450. How many of each type of ticket did you sell?

Define variables:

S = # of Student Tickets
G = # of General Admin Tickets

System of equations:

$$S + G = 350$$

$$3S + 5G = 1450$$

Solve

$$G = 200$$

$$S = 150$$

State your solution(s):

I sold 200 general admission tickets and 150 student tickets.

2. Simon invests $1200 into two savings accounts. One account earns 4% annual interest and the other earns 5.9% annual interest. At the end of 1 year, Simon earned $64.15 in interest. How much did he invest at each rate?

Define variables:

X = amount invested at 4%

Y = amount invested at 5.9%

System of equations:

$$X + Y = 1200$$

$$0.04X + 0.059Y = 64.15$$

Solve

$$X = 350$$

$$Y = 850$$

State your solution(s):

Simon invested $350 at 4% annual interest and invested $850 at 5.9% annual interest.

3. At an Italian bistro, the costs of 2 plates of spaghetti and 1 salad is $27.50. The cost for 4 plates of spaghetti and 3 salads is $59.50. Find the cost of a plate of spaghetti and a salad.

Define variables:

P = cost plate of spaghetti

S = cost salad

System of equations:

$2P + S = 27.50$

$4P + 3S = 59.50$

State your solution(s):

A plate of spaghetti costs $11.50 and a salad costs $4.50.

Solve

$P = 11.50$

$S = 4.50$

4. Peggy walks at a rate of 2 miles per hour and jogs at a rate of 4 miles per hour. She walked and jogged 3.4 miles in 1.2 hours. For how long did Peggy jog and for how long did she walk?

Define variables:

W = hours walked

J = hours jogged

System of equations:

$$W + J = 1.2$$

$$2W + 4J = 3.4$$

State your solution(s):

Peggy walked for 0.7 hours and jogged for 0.5 hours.

Solve

$W = .7$

$J = .5$

Going with the flow

When given a boat or plane distance problem follow these steps

First of all D=rt

Going against distance = (speed-with)time

Going with distance=(speed+with)time

Traveling apart

- Distance=rate(one car)time+rate(of other)time

Travelling together

- Distance=rate(first)time- Rate(second)time

- Two cyclists start at the same time from opposite ends of a course that is 45 miles long. One cyclist is riding at 14 mph and the second cyclist is riding at 16 mph. How long after they begin will they meet?

- A boat travels for three hours with a current of 3 mph and then returns the same distance against the current in four hours. What is the boat's speed in calm water? How far did the boat travel one way?

- With the wind, an airplane travels 1120 miles in seven hours. Against the wind, it takes eight hours. Find the rate of the plane in still air and the velocity of the wind.