

Day 7 - Real World Applications of Systems - Notes

When to Use Slope Intercept Form ($y = mx + b$)

- **Rate** – the rate is your slope
 - This number is always related to the x value
 - Per or each is often associated with slope
- **Flat Fee/Starting Amount** – this is your y-intercept
 - This value is constant

When to Use Standard Form ($Ax + By = C$)

- **Two Numbers** – represent x and y
 - Numbers per x and numbers per y
 - Typically addition is involved
- **Total** – what equation is set equal to
- No beginning amount
- Neither variable is dependent on the other

Scenario 1: The admission fee for the county fair includes parking, amusement rides, and admission to all commercial, agricultural, and judging exhibits. The cost for general admission is \$7 and the price for children is \$4. There were 449 people who attended the fair on Thursday. The admission fees collected amounted to \$2768. How many children and adults attended the fair?

$$\begin{array}{l}
 x: \# \text{ of children} \rightarrow (x + y = 449) \rightarrow -4x - 4y = -1796 \\
 y: \# \text{ of adults} \rightarrow 4x + 7y = 2768 \\
 \hline
 3y = 972 \\
 y = 324 \\
 \hline
 x + 324 = 449 \\
 x = 125
 \end{array}$$

There were 125 Children and 324 adults who attended the fair.

Scenario 2: Ms. Ross told her class that tomorrow's math test will have 20 questions and be worth 100 points. The multiple choice questions will be 3 points each and the open ended response questions will be 8 points each. Determine how many multiple choice and open ended response questions are on the test.

$$\begin{array}{l}
 x: \text{MC Questions} \rightarrow -3(x + y = 20) \rightarrow -3x - 3y = -60 \\
 y: \text{open Questions} \rightarrow 3x + 8y = 100 \\
 \hline
 5y = 40 \\
 y = 8 \\
 \hline
 x + 8 = 20 \\
 x = 12
 \end{array}$$

There are 12 MC Questions and 8 open ended questions.

Scenario 3: Serena is ordering lunch from Tony's Pizza Parlor. John told her that when he ordered from Tony's last week, he paid \$34 for two 16 inch pizzas and two drinks. Jodi told Serena when she ordered one 16 inch pizza and three drinks, it cost \$23. What is the cost of one 16 inch pizza and one drink?

$$\begin{array}{l}
 x: \text{cost of a pizza} \rightarrow 2x + 2y = 34 \rightarrow 2x + 2y = 34 \\
 y: \text{cost of a drink} \rightarrow -2(x + 3y = 23) \rightarrow -2x - 6y = -46 \\
 \hline
 -4y = -12 \\
 y = 3 \\
 \hline
 x + 3(3) = 23 \\
 x + 9 = 23 \\
 x = 14
 \end{array}$$

A drink is \$3 and a pizza is \$14.

Scenario 4: The Strauss family is deciding between two lawn care services. Green Lawn charges a \$49 startup fee, plus \$29 per month. Grass Team charges a \$25 startup fee, plus \$37 per month.

x : # of months

y : total cost

a. In how many months will both lawn care services costs the same? What will that cost be?

Green Lawn: $y = 49 + 29x$

$$49 + 29x = 25 + 37x$$

Grass Team: $y = 25 + 37x$

$$24 = 8x$$

$$3 = x$$

$$y = 49 + 29(3)$$

$$y = 8136$$

At 3 months, both will cost \$136.

b. If the family will use the service for only 6 months, which is the better option? Explain.

$$y = 49 + 29(6)$$

$$y = 223$$

$$y = 25 + 37(6)$$

$$y = 247$$

Green lawn will be cheaper at 6 months.

Scenario 5: Jenna is deciding between two cell phone plans. The first plan has a \$50 signup fee and costs \$20 per month. The second plan has a \$40 signup fee and costs \$25 per month.

x : # of months

y : total cost

a. After how many months will the total costs be the same? What will the cost be?

Plan 1: $y = 50 + 20x$

$$40 + 25x = 50 + 20x$$

Plan 2: $y = 40 + 25x$

$$5x = 10$$

$$x = 2$$

$$y = 40 + 25(2)$$

$$y = 90$$

At 2 months, both plans will cost \$90.

b. If Jenna has to sign a one year contract, which plan will be cheaper?

$$y = 50 + 20(12)$$

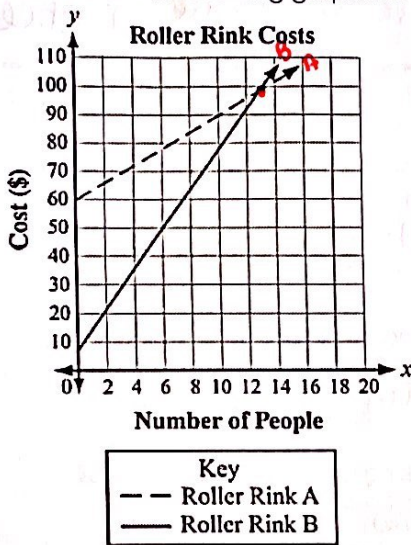
$$y = 290$$

$$y = 40 + 25(12)$$

$$y = 340$$

Plan 1 is cheaper at one year.

Scenario 6: The following graph shows the cost for going to two different skating rinks.



a. When is it cheaper to go to Roller Rink A?

More than 13 people

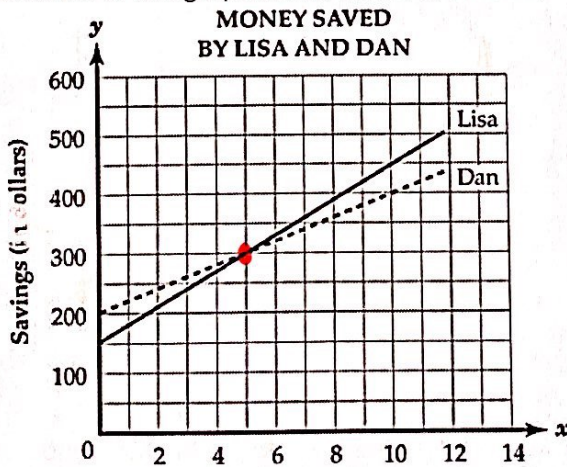
b. When is it cheaper to go to Roller Rink B?

Less than 13 people

c. When does it cost the same to go to either roller rink?

If 13 people attend

Scenario 7: The graph below shows the money saved by Lisa and Dan over the summer.



a. How long did it take for them to save the same amount of money? How much money did they both save?

5 weeks, they will both have saved \$300.

b. When did Lisa have more money saved?

After 5 weeks

c. When did Dan have more money saved?

Before 5 weeks