

Notes 1

For each problem, define the variables and then write a system of equations then solve.

- 1) Katherine is deciding which catering company she should use for Mom's 50th birthday party. At Bashful's Birthday Blast there is a fee of \$20.00 and a charge of \$9.00 per person. At Bertha's Ballroom Blitz there is a fee of \$100 and a charge of \$5.00 per person. For how many people will the cost become equal? What is that cost?

Identify the Variables: $x = \# \text{ of people}$ $y = \text{total cost}$

Bashfuls
 $y = 20 + 9x$

$$y = y$$

$$20 + 9x = 100 + 5x$$

$$4x = 80$$

$$x = 20$$

$$y = 20 + 9(20)$$

$$y = 20 + 180$$

$$y = 200$$

(20, 200)

Bertha's
 $y = 100 + 5x$

At 20 people it will cost \$200

- 2) Two companies sell stock shares on Wall Street. Losers Incorporated stock starts with a value of \$39.63 and loses \$0.08 for each new stockholder. The "Be Rich with Us" Corporation starts with a value of \$24.45 and gains \$0.03 in value for each new stockholder. At how many new stockholders will the value be equal? What is that value? (Solve by graphing)

$x = \text{stockholders}$ $y = \text{value}$

Losers

$$y = 39.63 - 0.08x$$

Be Rich

$$y = 24.45 + 0.03x$$

(138, 28.6)

At 138 stockholders both stocks will be worth \$28.60

- 3) Farmer Peter and Farmer Paula are picking apples from their apple trees. Farmer Peter has already picked 287 apples. Farmer Peter picks another 5 apples each minute. Farmer Paula has already picked 154 apples. Farmer Paula picks another 6 apples each minute. After how many minutes will the number of apples be the same? How many apples would each farmer have picked? (Solve by graphing and algebraically)

$x = \text{each minute}$

$y = \# \text{ of apples}$

Peter

$$y = 287 + 5x$$

$y = y$

$$287 + 5x = 154 + 6x$$

$$133 = x$$

$$y = 154 + 6(133)$$

$$y = 154 + 798$$

$$y = 952$$

Paula

$$y = 154 + 6x$$

(133, 952)

After 133 minutes they each picked 952 apples

- 4) Ted and Tom are saving money. Tom has saved \$1,477 and saves 64 more dollars each pay day. Ted has saved \$948 and saves 87 more dollars each pay day. How many days until they have saved the same amount? How much would they have saved? $x = \# \text{ of days}$ $y = \text{amount of \$}$

Ted
 $y = 948 + 87x$

Tom:

$y = 1477 + 64x$

$y = y$
 $948 + 87x = 1477 + 64x$
 $23x = 529$

$x = 23$

$y = 948 + 87(23)$

$y = 948 + 2001$

$y = 2949$

$(23, 2949)$

After 23 days they save \$2949.

- 5) The Slow Fix auto shop charges \$28 for parts and \$48 per hour of labor. The We Work Cheaper auto shop charges \$59 for parts and \$44.90 per hour of labor. How many hours until they charge the same amount? What would that cost be? $x = \# \text{ of hours}$ $y = \text{amount of \$}$

Slow Fix
 $y = 28 + 48x$

$28 + 48x = 59 + 44.90x$

$3.1x = 31$

$x = 10$

$(10, 508)$

$y = 28 + 48(10)$

$y = 28 + 480$

$y = 508$

We Work
 $y = 59 + 44.90x$

After 10 hours they will each charge \$508.

- 6) Each month the Midwest cell phone company has an operating fee of \$28.55 and charges \$0.48 per minute of calls. Each month, the Drop-Yo-Call Corporation has an operating fee of \$59 and charges \$0.19 per minute of calls. After how many minutes would the charges be the same? How much would they both charge? (Solve by graphing) $x = \text{per minute}$ $y = \text{total charge}$

Midwest
 $y = 28.55 + 0.48x$

28.55

Drop Yo

$y = 59 + 0.19x$

- 7) Two countries are keeping track of the cost of a barrel of oil in their country. In country A, a barrel of oil costs of \$40.05 and the price increases \$0.08 each day. In country B, a barrel of oil costs \$48.74 and the price decreases \$0.03 each day. After how many days would the price be equal? What would that price be? (Solve by graphing)

$x = \# \text{ of days}$ $y = \text{price of oil}$

Country A

$y = 40.05 + 0.08x$

Country B

$y = 48.74 - 0.03x$