Welcome! February 7th, 2018

Test Tomorrow! let's practice!

1. Solve by elimination: $2x - 5y = -24$

$3x + 2y = 2$

2. Solve by your favorite method:

$-3x + 2y = 5$

$2x + 4y = -4$

BELLWORK

1. Solve by ?: $2x - 5y = -24$
$3x + 2y = 2$

(-2, 4)

2. Solve by substitution: $-3x + 2y = 5$
$2x + 4y = -4$

$\left(-\frac{7}{4}, -\frac{1}{8}\right)$

2. Solve by substitution: $(-3x + 2y = 5)\,{-2}$

$2x + 4y = -4$

$6x - 4y = -10$

$2x + 4y = -4$

$8x = -14$

$x = -\frac{7}{4}$

$\frac{2}{1}\left(-\frac{7}{4}\right) + 4y = -4$

$-\frac{7}{2} + 4y = -4$

$+\frac{7}{2} \qquad +\frac{7}{2}$

$4y = -\frac{4}{1} + \frac{7}{2}$

$4y = -\frac{8}{2} + \frac{7}{2}$

$4y = -\frac{1}{2} \cdot \frac{1}{4} = -\frac{1}{8}$

$-\frac{1}{2} \div \frac{4}{1}$

$-\frac{1}{2} \cdot \frac{1}{4}$

$y = -\frac{1}{8}$

$\left(-\frac{7}{4}, -\frac{1}{8}\right)$

Fun Homework
P613, #3,6,10,12, 30, 46, 50

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

Multiply the first equation by 4 and the second equation by –3.
Then add.

$$\begin{aligned} 20x+12y&=4 \\ -9x-12y&=18 \\ \hline 11x&=22 \\ x&=2 \end{aligned}$$

$$\begin{aligned} 5(2)+3y&=1 \\ 3y&=-9 \\ y&=-3 \end{aligned}$$

The solution set is $\{(2,-3)\}$.

6. **a.** $C(x)=60,000+200x$

b. $R(x)=450x$

c. $450x = 60000 + 200x$
$250x = 60000$
$x = 240$
$450(240) = 108,000$
The company must make 240 desks at a cost of \$108,000 to break even.

10. Let x = the cost of the hotel
y = the cost of the car
$3x + 2y = 360$
$4x + 3y = 500$
Solve the system.

$$\begin{aligned} 12x+8y&=1440 \\ -12x-9y&=-1500 \\ -y&=-60 \\ y&=60 \end{aligned}$$

$$\begin{aligned} 3x+2(60)&=360 \\ 3x&=240 \\ x&=80 \end{aligned}$$

The room costs \$80 a day and the car rents for \$60 a day.

12.
$2x - y + z = 1 (1)$
$3x - 3y + 4z = 5 (2)$
$4x - 2y + 3z = 4 (3)$
Eliminate y from (1) and (2) by multiplying (1) by –3 and adding the result to (2).

$$\begin{aligned} -6x+3y-3z&=-3 \\ 3x-3y+4z&=5 \\ \hline -3x+z&=2 \quad (4) \end{aligned}$$

Eliminate y from (1) and (3) by multiplying (1) by –2 and adding the result to (3).

$$\begin{aligned} -4x+2y-2z&=-2 \\ 4x-2y+3z&=4 \\ \hline z&=2 \end{aligned}$$

Substituting $z = 2$ into (4), we get:
$-3x + 2 = 2$
$-3x = 0$
$x = 0$
Substituting $x = 0$ and $z = 2$ into (1), we have:
$2(0) - y + 2 = 1$
$-y = -1$
$y = 1$
The solution set is $\{(0, 1, 2)\}$.

30.

$$y^2 = 4x$$
$$x - 2y + 3 = 0$$
$$x = \frac{y^2}{4}$$

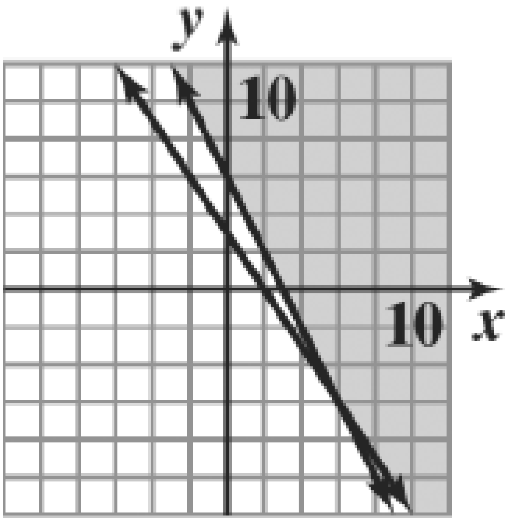
$$\frac{y^2}{4} - 2y + 3 = 0$$
$$y^2 - 8y + 12 = 0$$
$$(y-6)(y-2) = 0$$
$$y = 6, 2$$

If $y = 6, x = \frac{36}{4} = 9.$

If $y = 2, x = \frac{4}{4} = 1.$

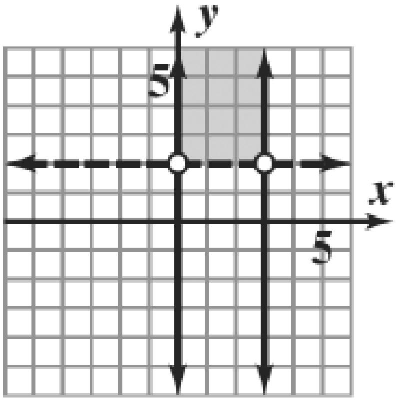
The solution set is $\{(9,6),(1,2)\}$.

46.



$$\begin{cases} 3x + 2y \geq 6 \\ 2x + y \geq 6 \end{cases}$$

50.



$$\begin{cases} 0 \le x \le 3 \\ y > 2 \end{cases}$$

Answers to Page 613-2
#2, 9, 11, 13, 31, 36

2. $x + 4y = 14$
$2x - y = 1$

Multiply the second equation by 4 and add to the first equation.

$$\begin{array}{r} x + 4y = 14 \\ \underline{8x - 4y = 4} \\ 9x = 18 \\ x = 2 \end{array}$$

$$\begin{aligned} 2(2) - y &= 1 \\ -y &= -3 \\ y &= 3 \end{aligned}$$

The solution set is $\{(2,3)\}$.

9. Let x = the length of a tennis table top.
Let y = the width.
Use the formula for perimeter of a rectangle to write the first equation and the other information in the problem to write the second equation.

$2x + 2y = 28$

$4x - 3y = 21$

Multiply the first equation by −2.

$$\begin{array}{r} -4x + 4y = -56 \\ \underline{4x - 3y = \;\;21} \\ -7y = -35 \\ y = 5 \end{array}$$

Back-substitute to find x.

$$\begin{aligned} 2x + 2(5) &= 28 \\ 2x + 10 &= 28 \\ 2x &= 18 \\ x &= 9 \end{aligned}$$

The length is 9 feet and the width is 5 feet, so the dimensions of the table are 9 feet by 5 feet.

11. x = number of apples
y = number of avocados

$$100x + 350y = 1000$$
$$24x + 14y = 100$$

$$100x + 350y = 1000$$
$$\underline{-600x - 350y = -2500}$$
$$-500x = -1500$$
$$x = 3$$

$$100(3) + 350y = 1000$$
$$350y = 700$$
$$y = 2$$

3 apples and 2 avocados supply 1000 calories and 100 grams of carbohydrates.

13. $x + 2y - z = 5$ (1)
$2x - y + 3z = 0$ (2)
$2y + z = 1$ (3)

Eliminate x from (1) and (2) by multiplying (1) by –2 and adding the result to (2).

$$-2x - 4y + 2z = -10$$
$$\underline{2x - y + 3z = 0}$$
$$-5y + 5z = -10$$
$$y - z = 2 \quad (4)$$

Adding (3) and (4), we get:

$$2y + z = 1$$
$$\underline{y - z = 2}$$
$$3y = 3$$
$$y = 1$$

Substituting $y = 1$ into (3), we have:
$2(1) + z = 1$
$z = -1$

Substituting $y = 1$ and $z = -1$ into (1), we obtain:
$x + 2(1) - (-1) = 5$
$x + 3 = 5$
$x = 2$

The solution set is $\{(2, 1, -1)\}$.

31. $$x^2 + y^2 = 10$$
$$y = x + 2$$

$$x^2 + (x+2)^2 = 10$$
$$x^2 + x^2 + 4x + 4 - 10 = 0$$
$$2x^2 + 4x - 6 = 0$$
$$x^2 + 2x - 3 = 0$$
$$(x+3)(x-1) = 0$$
$$x = -3, 1$$

If $x = -3$, $y = -3 + 2 = -1$.
If $x = 1$, $y = 1 + 2 = 3$.

The solution set is $\{(-3, -1), (1, 3)\}$.

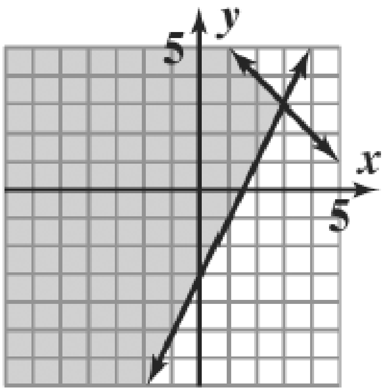
36. $$2L + 2W = 26$$
$$LW = 40$$
$$L = \frac{40}{W}$$

$$2\left(\frac{40}{W}\right) + 2W = 26$$
$$\frac{80}{W} + 2W = 26$$
$$80 + 2W^2 = 26W$$
$$2W^2 - 26W + 80 = 0$$
$$W^2 - 13W + 40 = 0$$
$$(W-8)(W-5) = 0$$
$$W = 8, 5$$

If $W = 5, L = \frac{40}{5} = 8$

The dimensions are 8 m by 5 m.

49.



$$\begin{cases} x + y \le 6 \\ y \ge 2x - 3 \end{cases}$$

Bonus Bellwork

A wholesale bakery makes large and small loaves of rye bread. The profit on a large loaf is $ .10 and the profit on the small loaf is $ .08. No more than 300 loaves of bread are baked daily. To meet demand, at least 150 small loaves and at least 75 large loaves must be made each day. Let x = number of large loaves; y = number of small loaves

1. Write the objective function:

2. Write the systems of constraints and graph.

3. Determine the maximum daily profit on rye bread and how many of each size loaf should be made to reach this maximum.

Bellwork

A wholesale bakery makes large and small loaves of rye bread. The profit on a large loaf is $ .10 and the profit on the small loaf is $ .08. No more than 300 loaves of bread are baked daily. To meet demand, at least 150 small loaves and at least 75 large loaves must be made each day. Let x = number of large loaves; y = number of small loaves

1. Write the objective function: $P = 10x + 8y$

2. Write the systems of constraints and graph.

3. Determine the maximum daily profit on rye bread and how many of each size loaf should be made to reach this maximum. $27.00, 150 of each

Welcome to The Chapter 5 Review

Graph $3x + 4y > 12$

Use Gaussian elimination to solve the following system.

$$\begin{aligned} x + 2y + 3z &= 16 \\ x + y + 2z &= 9 \\ x - y + 2z &= 5 \end{aligned}$$

Solve the following system by Gaussian Elimination.

$$x + y + z = 3$$
$$x - y + z = 7$$
$$2x + y + z = 4$$

$2x + 2z = 10 \rightarrow 2x + 2z = 10$

$-1(3x + 2z = 11) \rightarrow -3x - 2z = -11$

$-x = -1$

$x = 1$

$3(1) + 2z = 11$

$3 + 2z = 11$

$-3 \quad -3$

$2z = 8$

$z = 4$

$1 + y + 4 = 3$

$y + 5 = 3$

$-5 \quad -5$

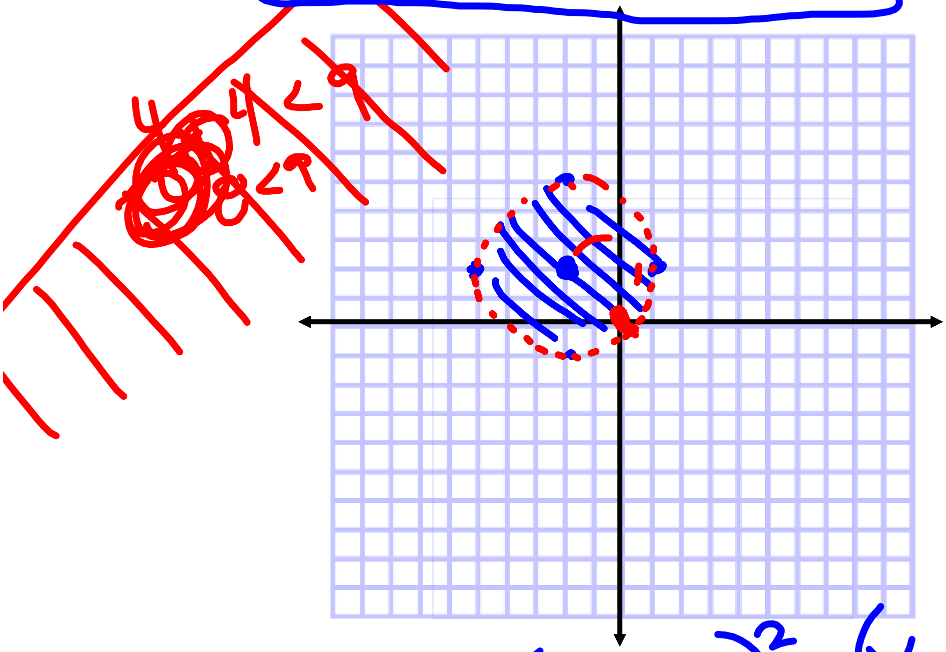
$y = -2$

$(1, -2, 4)$

Graph: $(x + 2)^2 + (y - 2)^2 < 9$

CIRCLE: $(x-h)^2+(y-k)^2=r^2$

CENTER (h,k) → $(-2,2)$



$(x-h)^2+(y-k)^2=r^2$