

3. Solve the system by substitution

$$\begin{cases} x^2 - y^2 = 9 \\ x - y = 1 \end{cases} \rightarrow y = x - 1$$

$$x^2 - (x-1)^2 = 9$$

$$x^2 - (x^2 - 2x + 1) = 9$$

$$x^2 - x^2 + 2x - 1 = 9$$

$$2x - 1 = 9$$

$$2x = 10$$

$$x = 5$$

$$5 - y = 1$$

$$y = 4$$

$(5, 4)$

13. You set up a business and make an initial investment of \$10,000. The unit cost of the product is \$2.85 and the selling price is \$4.95. How many units must you sell to break even? (Assume all units made are sold).

$x = \text{number of units}$

$$C = 10000 + 2.85x$$

$$R = 4.95x$$

break even: $C = R$


$$4.95x = 10000 + 2.85x$$

$$2.1x = 10000$$

$$x = 4761.9047$$

$x \approx 4762 \text{ units}$

15. The perimeter of a rectangle is 480 meters and its length is 1.5 times its width. Find the dimensions of the rectangle.



$$P = 2L + 2W$$

$$L = 1.5W$$

$$50 L - 1.5W = 0$$

$$2L + 2W = 480$$

$$W = \frac{480}{5} = 96$$

$$L - 1.5(96) = 0$$

$$L = 144$$

$144 \text{ m} \times 96 \text{ m}$

32. A total of \$46,000 is invested in two corporate bonds that pay 6.75% and 7.25% simple interest. The investor want an annual interest income of \$3,245 from the investments. What is the most that can be invested in the 6.75% bond?

$$\begin{cases} x + y = 46000 \\ 0.0675x + 0.0725y = 3245 \end{cases}$$

$$y = \frac{140000}{50} = \$28,000$$

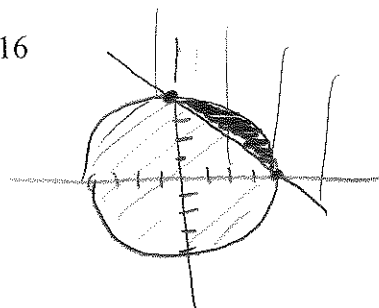
$$x + 28000 = 46000$$

$$x = \$18,000$$

$\text{max } \$18,000 \text{ in } 6.75\% \text{ bond}$

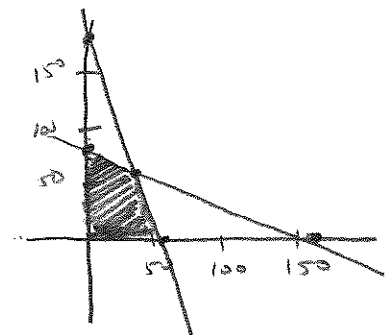
61. Graph the system of inequalities:

$$\begin{cases} x^2 + y^2 \leq 16 \\ x + y \geq 4 \end{cases}$$



65. Graph the system of inequalities:

$$\begin{cases} x + 2y \leq 160 \\ 3x + y \leq 180 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



37. Solve the system using Gaussian elimination:

$$\begin{cases} x+3y-z=13 \\ 2x-5z=23 \\ 4x-y-2z=14 \end{cases}$$

$$\begin{cases} x+3y-z=13 \\ 2x-5z=23 \\ 4x-y-2z=14 \end{cases}$$

$$y = \frac{40}{17}$$

$$\left(-2\left(\frac{40}{17}\right) - z = -1\right) 17$$

$$-80 - 17z = -17$$

$$-17z = 63$$

$$z = \frac{-63}{17}$$

$$\left[x + 3\left(\frac{40}{17}\right) - \left(\frac{-63}{17}\right) = 13\right] 17$$

$$17x + 120 + 63 = 221$$

$$17x = 38$$

$$x = \frac{38}{17}$$

$$\left(\frac{38}{17}, \frac{40}{17}, \frac{-63}{17}\right)$$

$$\begin{cases} -2R_1 + R_2 \\ -4R_1 + R_3 \end{cases} \begin{cases} x+3y-z=13 \\ -6y-3z=-3 \\ -13y+2z=-38 \end{cases}$$

$$\begin{cases} \frac{1}{3}R_2 \\ -R_2 + R_3 \end{cases} \begin{cases} x+3y-z=13 \\ -2y-z=-1 \\ -13y+2z=-38 \end{cases}$$

$$\begin{cases} 2R_2 + R_3 \end{cases} \begin{cases} x+3y-z=13 \\ -2y-z=-1 \\ -17y=-40 \end{cases}$$

54. An inheritance of \$20,000 was divided among three investments yielding \$1,780 in interest per year. The interest rates for the three investments were 7%, 9%, and 11%. Find the amount placed in each investment if the second and third were \$3,000 and \$1,000 less than the first, respectively.

$$x \rightarrow 7\%, y \rightarrow 9\%, z \rightarrow 11\%$$

$$y = x - 3000 \rightarrow -x + y = -3000$$

$$z = x - 1000 \rightarrow -x + z = -1000$$

$$\begin{cases} x+y+z=20000 \\ -x+y=-3000 \\ -x+z=-1000 \end{cases}$$

$$\times 100 \quad (107x + 109y + 11z = 17800)$$

only need 3 equations - pick 3, and check answer in 4th:

$$\begin{cases} x+y+z=20000 \\ 7x+9y+11z=178000 \\ -x+y=-3000 \end{cases}$$

$$\begin{cases} R_1 + R_2 \\ R_1 + R_3 \end{cases} \begin{cases} x+y+z=20000 \\ 2y+4z=38000 \\ 2y+z=17000 \end{cases}$$

$$\begin{cases} -R_2 + R_3 \end{cases} \begin{cases} x+y+z=20000 \\ 2y+4z=38000 \\ -3z=-21000 \end{cases}$$

$$z = \frac{-21000}{-3} = 7000$$

$$2y + 4(7000) = 38000$$

$$y = 5000$$

$$x + (5000) + (7000) = 20000$$

$$x = 8000$$

check in 4th equation

$$-x + z = -1000$$

$$-(8000) + (7000) = -1000$$

$$-1000 = -1000 \checkmark$$

$$\left(8000, 5000, 7000\right)$$

Honors Algebra 3-4
Ch7 Review #3

Name _____
Period _____

3. Solve the system by substitution

$$\begin{cases} x^2 - y^2 = 9 \\ x - y = 1 \end{cases}$$

13. You set up a business and make an initial investment of \$10,000. The unit cost of the product is \$2.85 and the selling price is \$4.95. How many units must you sell to break even? (Assume all units made are sold).

15. The perimeter of a rectangle is 480 meters and its length is 1.5 times its width. Find the dimensions of the rectangle.

32. A total of \$46,000 is invested in two corporate bonds that pay 6.75% and 7.25% simple interest. The investor want an annual interest income of \$3,245 from the investments. What is the most that can be invested in the 6.75% bond?

61. Graph the system of inequalities:

$$\begin{cases} x^2 + y^2 \leq 16 \\ x + y \geq 4 \end{cases}$$

65. Graph the system of inequalities:

$$\begin{cases} x + 2y \leq 160 \\ 3x + y \leq 180 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

37. Solve the system using Gaussian elimination:

$$\begin{cases} x + 3y - z = 13 \\ 2x - 5z = 23 \\ 4x - y - 2z = 14 \end{cases}$$

54. An inheritance of \$20,000 was divided among three investments yielding \$1,780 in interest per year. The interest rates for the three investments were 7%, 9%, and 11%. Find the amount placed in each investment if the second and third were \$3,000 and \$1,000 less than the first, respectively.