

Use linear combination, or substitution, to solve the system of equations.

$$-2(3x - 2y = -38)$$

$$1. \quad 6x + 5y = -13$$

$$-6x + 4y = 76$$

$$9y = 63$$

$$y = 7$$

$$3x - 14 = -38$$

$$3x = -24$$

$$x = -8$$

$$2. \quad 6x - 7y = 35$$

$$-3(2x + 5y = -25)$$

$$6x - 7y = 35$$

$$-6x - 15y = 75$$

$$-22y = 110$$

$$y = -5$$

$$2x + 5(-5) = -25$$

$$2x - 25 = -25$$

$$2x = 0$$

$$x = 0$$

$$3. \quad 5(24x - 56y = 72)$$

$$-8(15x - 35y = -45)$$

$$120x - 280y = 360$$

$$-120x + 280y = +360$$

$$0 = 720$$

inconsistent

$$4. \quad \begin{array}{l} (15x - 12y = 18) \div 3 \quad 5x - 4y = 6 \\ (10x - 8y = 12) \div 2 \quad - (5x - 4y = 6) \end{array}$$

$$0 = 0$$

dependent

5. Assume that the time it takes to construct a road varies linearly with the number of workers on the job. If there are 100 people working, the job will be finished in 14 weeks. If there are 200 men working, the job will be finished in 7 weeks.

- a. Write the particular equation for this function.

(#workers, time)

(100, 14)

(200, 7)

$$m = \frac{14 - 7}{100 - 200} = \frac{-7}{100}$$

$$y - 14 = \frac{-7}{100}(x - 100)$$

$$y = \frac{-7}{100}x + 21$$

- b. How long will it take a crew of 250 to complete the job?

$$y = \frac{-7}{100}(250) + 21$$

$$= 3.5 \text{ weeks}$$

- c. If you have only 4 weeks to complete the job, how many will make up your work crew?

$$4 = \frac{-7}{100}x + 21$$

$$-17 = \frac{-7}{100}x$$

$$x = 243 \text{ people}$$

Do 6 and 7 by hand, without the Matrix function of your graphing calculator. Then, use your graphing calculator to check your answers.

$$\begin{array}{l} 2x+3y-z=9 \\ 6.4(x-3y+z=-6) \\ 3x+y-4z=31 \end{array} \rightarrow \begin{array}{l} 3x=3 \\ \boxed{x=1} \end{array}$$

$$\begin{array}{l} x+2y-5z=-12 \\ 7.2(2x+2y-3z=-2) \\ 3x-4y-z=11 \end{array} \rightarrow \begin{array}{l} -x-2y+5z=12 \\ 2x+2y-3z=-2 \\ \hline x+2z=10 \end{array}$$

$$\begin{array}{l} 4x-12y+4z=-24 \\ 3x+y-4z=31 \end{array}$$

$$\begin{array}{l} 4x+4y-6z=-4 \\ 3x-4y-z=11 \end{array}$$

$$\begin{array}{l} x+2z=10 \\ -(x-z=11) \\ \hline 3z=9 \end{array}$$

$$7x-11y=7$$

$$2(1)+3(0)-z=9$$

$$7x-7z=7$$

$$\begin{array}{l} 3z=9 \\ \boxed{z=3} \end{array}$$

$$7-11y=7$$

$$2-z=9$$

$$x-z=1$$

$$-11y=0$$

$$-z=7$$

$$x-3=1$$

$$\boxed{y=0}$$

$$\boxed{z=-7}$$

$$\boxed{x=4}$$

$$\begin{array}{l} 4+2y-15=-12 \\ 2y=-1 \\ \boxed{y=-1/2} \end{array}$$

8. The sum of the digits of a three-digit number is 12. The tens digit is 2 less than the hundreds digit, and the units digit is 4 less than the sum of the other two digits. What is the number? Set up a system of equations and solve the problem without your calculator. Define your variables.

x = hundreds digit
 y = tens digit
 z = unit digit

$$x+y+z=12$$

$$x+y+z=12$$

$$x-2=y$$

$$x-y=2$$

$$z=x+y-4$$

$$x+y-z=4$$

$$2x+2y=16$$

$$\begin{array}{l} y=5-2 \\ \boxed{y=3} \end{array}$$

$$x+y=8$$

$$x-y=2$$

$$\begin{array}{l} z=5+3-4 \\ \boxed{z=4} \end{array}$$

$$2x=10$$

$$\boxed{x=5}$$

Number
 $\boxed{534}$

9. Monica decided to divide a total of \$42,000 into three investments: a savings account paying 5% interest, a time deposit paying 7%, and a bond paying 9%. Her total annual interest from the three investments was \$2600, and the interest from the savings account was \$200 less than the total interest from the other two investments. How much did she invest at each rate? Set up a system of equations, and use the Matrix function of your graphing calculator to solve the problem. Define your variables.

x = \$ in savings

y = \$ in time deposit

z = \$ in bond

$$x+y+z=42,000$$

$$.05x+.07y+.09z=2600$$

$$.05x=.07y+.09z-200$$

$$.05x-.07y-.09z=-200$$

\$ in savings \$24,000

\$ in time deposit \$11,000

\$ in bond \$7,000