

Lesson 2.2 - Pairs of Linear Equations

AKA: Systems of Equations

EXAMPLE #1

Dean buys 3 chocolate bars and 4 cokes for \$12. Poppy buys 5 chocolate bars and 1 coke for \$3. Write the system of equations and solve.

x = chocolate bars

y = cokes

$$\begin{array}{r} 3x + 4y = 12 \\ 4(5x + y = 3) \\ \hline 3x + 4y = 12 \\ \ominus 20x + 4y = 12 \\ \hline -17x = 0 \\ \frac{-17}{-17} \quad \frac{-17}{-17} \\ x = 0 \end{array}$$

$$\begin{array}{r} 5(0) + y = 3 \\ 0 + y = 3 \\ y = 3 \end{array}$$

Chocolate bars are free + cokes are \$3 each.

How to use the GDC to solve a system of equations.

1. Put each equation in gradient-intercept form ($Y=$).
2. Press $Y=$ and type the equations into $Y1$ & $Y2$.
3. Press GRAPH, 2nd TRACE (CALC) & select intersection.
4. Scroll & get as close to the intersection as possible and press enter 3 times.

The solution will show on the bottom of the screen.

EXAMPLE #2

- a. Use your GDC to plot the graph of each equation and hence solve the following pair of linear equations:

$$y + x = 2 \quad \text{and} \quad y + 3x = 0$$

$$y = -x + 2$$

$$y = -3x$$

- b. Solve the following pairs of equations using an algebraic method.

$$-x + 2 = -3x$$

$$2 = -2x$$

$$-1 = x$$

$$y = -(-1) + 2$$

$$y = 1 + 2$$

$$y = 3$$

Solution:

$(-1, 3)$

EXAMPLE #3

One day, Kazuo orders three drinks and two pizzas from a pizza restaurant in town. The total cost comes to \$7.95. The next day, Kazuo orders five drinks and three pizzas. This time he pays \$12.42. He expects his friends to pay him back for these purchases. But what is the cost of one drink? And what is the cost of one pizza?

$x = \text{drinks}$
 $y = \text{pizzas}$

Each drink
cost \$.99 +
each pizza
cost \$2.49.

$$\begin{aligned} 3(3x + 2y &= 7.95) \\ 2(5x + 3y &= 12.42) \end{aligned}$$

$$\begin{aligned} 9x + 6y &= 23.85 \\ \ominus 10x + 6y &= 24.84 \end{aligned}$$

$$-x = -.99$$

$$x = .99$$

$$3(.99) + 2y = 7.95$$

$$2.97 + 2y = 7.95$$

$$2y = 4.98$$

$$y = 2.49$$