

## SOLVING A SYSTEM BY ELIMINATION

Solve.

$$2x + y = -7$$

$$x + y = -4$$

Step 1: Look for the variable that has the same coefficient. Add or subtract the system of equations to eliminate that variable and solve for it.

$$\begin{array}{r} 2x + y = -7 \\ - \quad x + y = -4 \\ \hline x = -3 \end{array}$$

To eliminate "y" subtract the 2 equations  
Both y values are positive, so subtract,

Step 3: Substitute back into one of the equation that you started with and solve for the other variable. Verify your solution.

$$x = -3$$

$$x + y = -4$$

$$\begin{array}{r} (-3) + y = -4 \\ +3 \quad +3 \end{array}$$

$$y = -1$$

$(-3, -1)$

EX. 1

Solve these linear systems by elimination.

$$\begin{aligned} 2x + y &= -5 \\ \text{a) } 3x + 5y &= 3 \end{aligned}$$

Step 1: Look for the variable that has the same coefficient, if there is none then choose one variable to eliminate. Multiple the equation(s) to get the same coefficient.

$$\begin{array}{l} \times 5 \quad \times^5 (2x) + (y) = (-5) \\ \quad \quad \quad 3x + 5y = 3 \end{array} \quad \text{OR} \quad \begin{array}{l} \times 3 \quad \times^3 (2x) + (y) = (-5) \\ \times 2 \quad \times^2 (3x) + (5y) = (3) \end{array}$$

Step 2: Add or subtract the system of equations to eliminate that variable and solve for it.

$$\begin{array}{r} 10x + 5y = -25 \\ - 3x + 5y = -3 \quad \text{subtract} \\ \hline 7x = -28 \\ x = -4 \end{array}$$

$$\begin{array}{r} 6x + 3y = -15 \\ - 6x + 10y = -6 \quad \text{subtract} \\ \hline -7y = -21 \\ y = 3 \end{array}$$

Step 3: Substitute back into one of the equation that you started with and solve for the other variable. Verify your solution.

$$\begin{aligned} x &= -4 \\ 3x + 5y &= 3 \\ 3(-4) + 5y &= 3 \\ -12 + 5y &= 3 \\ +12 \quad \quad +12 \\ 5y &= 15 \\ y &= 3 \end{aligned}$$

$$\begin{aligned} y &= 3 \\ 2x + (3) &= -5 \\ 2x &= -8 \\ x &= -4 \end{aligned}$$

$$(-4, 3)$$

b)  $\begin{array}{r} +y \\ -y \end{array} > \text{add}$   
 $x+y=-1$   
 $-4x-y=-8$   


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 $-3x = -9$   
 $x=3$

$(3) + y = -1$   
 $y = -4$

$(3, -4)$

One y Value is positive and the other is negative so you add the two equations

c)  $\begin{array}{r} x^4 \\ x^4 \\ x^4 \end{array}$   
 $3x-y=-5$   
 $8x-4y=-12$   
 $12x-4y=-20$   
 $-8x+4y=-12$  subtract  


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 $4x = -8$   
 $x = -2$

$3(-2) - y = -5$   
 $-6 - y = -5$   
 $-\frac{1}{1}y = \frac{+1}{-1}$

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

c)  $\begin{array}{r} x^2 \\ x^2 \\ x^2 \end{array}$   
 $7x-5y=30$   
 $9x-10y=10$

$14x-10y=60$   
 $-9x+10y=-10$  subtract  


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 $5x = 50$   
 $x = 10$

$7(10) - 5y = 30$   
 $70 - 5y = 30$   
 $-70 \quad -70$   
 $-5y = 40$   
 $y = 8$   
 $(10, 8)$

d)  $\begin{array}{r} x^5 \\ x^5 \\ x^5 \end{array}$   
 $2x+3y=6$   
 $5x+10y=20$

$10x+15y=30$   
 $-10x+20y=40$  subtract  


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 $5y = 10$   
 $y = 2$

$2x + 3(2) = 6$   
 $2x + 6 = 6$   
 $\frac{2x}{2} = \frac{0}{2}$   
 $x = 0$   
 $(0, 2)$

EX. 3

Brad went to Wal-Mart, he found out that two tapes and three CD's cost \$31.00. And three tapes and two CD's cost \$29.00. Find the cost of one tape and one CD.

let  $x \rightarrow$  tapes

let  $y =$  CD's

$$\times 3 \quad 3(2x) + 3(3y) = 3(31)$$

$$\times 2 \quad 2(3x) + 2(2y) = 2(29)$$

$$6x + 9y = 93$$

$$- \underline{6x + 4y = 58}$$

subtract

$$\frac{5y}{5} = \frac{35}{5}$$

$$y = 7$$

$$2x + 3(7) = 31$$

$$2x + 21 = 31$$

$$- 21 \quad - 21$$

$$2x = 10$$

$$x = 5$$

$$(5, 7)$$

$$2(5) + 3(7) = 31$$

$$10 + 21 = 31$$

$$31 = 31$$

$$3(5) + 2(7) = 29$$

$$15 + 14 = 29$$

$$29 = 29$$

The cost of 1 tape is \$5.00  
& the cost of 1 CD is \$7.00