

# Using Tables to Solve Systems

A system of linear equations consists of two or more equations with the same variables. To solve a system of equations with two or more variables, find the ordered pair that satisfies all of the equations. You can solve a system of equations by using the **TABLE** feature on a graphing calculator.

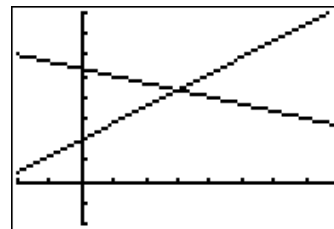
## Example Use the TABLE Feature

Use the **TABLE** feature on a graphing calculator to solve the system  $x + 3y = 16$  and  $7x - 9y = -18$ .

**Step 1** Solve each equation for  $y$ .

$x + 3y = 16$	Original equations	$7x - 9y = -18$
$3y = -x + 16$	Isolate the $y$ -term.	$-9y = -7x - 18$
$y = -\frac{1}{3}x + \frac{16}{3}$	Divide to solve for $y$ .	$y = \frac{7}{9}x + 2$

**Step 2** Enter each equation in  $Y=$  list and press  $\%$ . The lines appear to intersect at about the point  $(3, 4)$ .



$[-2, 8]$  scl:1 by  $[-2, 8]$  scl: 1

**Step 3** Press  $\hat{=}$  to represent the system of equations as two tables of values. Look at values of  $x$  that are close to 3.

Notice that 4.3333 appears as a value for both  $Y_1$  and  $Y_2$  when  $x = 3$ , indicating that the point  $(3, 4.333)$  is one that the two graphs have in common. We can conjecture that the actual point of intersection, and the solution of the system of equations, is  $(3, 4\frac{1}{3})$  or  $(3, \frac{13}{3})$ .

X	Y <sub>1</sub>	Y <sub>2</sub>
0	5.3333	2
1	5	2.7778
2	4.6667	3.5556
3	4.3333	4.3333
4	4	5.1111
5	3.6667	5.8889
6	3.3333	6.6667

X=3

**CHECK**

$x + 3y = 16$	Original equations	$7x - 9y = -18$
$3 + 3\left(\frac{13}{3}\right) = 16$	$x = 3$ and $y = \frac{13}{3}$	$7(3) - 9\left(\frac{13}{3}\right) = -18$
$3 + 13 = 16 \checkmark$	Simplify.	$21 - 39 = -18 \checkmark$

## Exercises

Use the **TABLE** feature on a graphing calculator to solve each system of equations.

- |  |  |  |
|--|--|--|
| <p>1. <math>x + y = 1</math><br/><math>x - y = 6</math></p>    | <p>2. <math>3x - 2y = 10</math><br/><math>3x - 5y = 1</math></p> | <p>3. <math>4x - 6y = 10</math><br/><math>3x + 6y = 4</math></p>   |
| <p>4. <math>3x - 2y = 0</math><br/><math>x + 6y = 5</math></p> | <p>5. <math>6x - 4y = 11</math><br/><math>2x + 2y = 7</math></p> | <p>6. <math>9x + 8y = 7</math><br/><math>18x - 15y = 14</math></p> |

## ***Using Tables to Solve Systems***

### **Answers**

1.  $\left(\frac{7}{2}, -\frac{5}{2}\right)$

2.  $\left(\frac{16}{3}, 3\right)$

3.  $\left(2, -\frac{1}{3}\right)$

4.  $\left(\frac{1}{2}, \frac{3}{4}\right)$

5.  $\left(\frac{5}{2}, 1\right)$

6.  $\left(\frac{7}{9}, 0\right)$