Name _____ Class _____ Date _____

# 3-1 Reteaching

## Solving Systems Using Tables and Graphs

**As you solve a system of equations, remember the following ideas.**

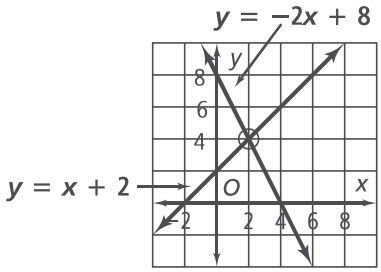
- Lines that have the same slopes but different *y*-intercepts are parallel and will never intersect. These systems are *inconsistent*.
- Lines that have both the same slope and the same *y*-intercept are the same line and will intersect at every point. These systems are *dependent*.
- Lines that have different slopes will intersect, and the system will have one solution. These systems are *independent*.

**Problem**

Using a graph or a table, what is the solution of the system of equations? $\begin{cases} 2x + y = 8 \\ y - x = 2 \end{cases}$

$y = -2x + 8$ — Write both equations in $y = mx + b$ form.

$y = x + 2$




Graph the line $y = -2x + 8$. Graph the line $y = x + 2$. Circle the point of intersection.

$x = 2, y = 4$ — Determine the *x*- and *y*-coordinates of the point of intersection.

The solution is the ordered pair (2, 4).

**Check** $2(2) + 4 \stackrel{?}{=} 8$ — Check by substituting the solution into both equations.

$4 + 4 \stackrel{?}{=} 8$

$8 = 8$ ✓

$4 - 2 \stackrel{?}{=} 2$

$2 = 2$ ✓

## Exercises

**Solve each system by graphing or using a table. Check your answers.**

1. $\begin{cases} 3x + y = 6 \\ y = 3 \end{cases}$ (1, 3)

2. $\begin{cases} -2x + y + 3 = 0 \\ x - 1 = y \end{cases}$ (2, 1)

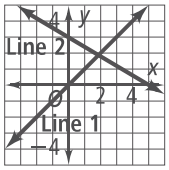
3. $\begin{cases} x + y = 3 \\ y = 3x - 1 \end{cases}$ (1, 2)

4. $\begin{cases} y = 1 - x \\ 2x + y = 4 \end{cases}$ (3, −2)

5. $\begin{cases} -x + 2y = 2 \\ 3x + 2y = -6 \end{cases}$ (−2, 0)

6. $\begin{cases} -x + y = -2 \\ -2x + 3y = -3 \end{cases}$ (3, 1)

7. Which point lies on both Line 1 and Line 2? C




Ⓐ (0, 0)

Ⓑ (2.05, 2.05)

Ⓒ (1.875, 1.875)

Ⓓ (2, 2)

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# 3-1 Reteaching (continued)

## Solving Systems Using Tables and Graphs

**Problem**

The table shows the winning times for the Olympic 400-M dash. Use your graphing calculator to find linear models for women's and men's winning times. Assuming the trends in the table continue, when will the women's winning time and the men's winning time be equal? What will that winning time be?

**Winning Times for the Olympic 400-M Dash (seconds)**

| Year | 1968 | 1972 | 1976 | 1980 | 1984 | 1988 | 1992 | 1996 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Men's Times | 43.86 | 44.66 | 44.26 | 44.60 | 44.27 | 43.87 | 43.50 | 43.49 | 43.84 |
| Women's Times | 52.03 | 51.08 | 49.29 | 48.88 | 48.83 | 48.65 | 48.83 | 48.25 | 49.11 |

SOURCE: International Olympic Committee

**Step 1** Enter the data into lists on your calculator.

L1: number of years since 1968 (value for $x$)

L2: men's winning times in seconds (value for $y_1$)

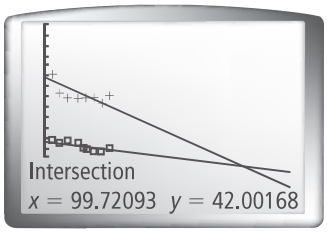
L3: women's winning times in seconds (value for $y_2$)

**Step 2** Use LinReg($ax + b$) to find linear models. This determines the equation of the lines of best fit for the selected data.

Use L1 and L2 for the men's winning times.

Use L1 and L3 for the women's winning times.

**Step 3** Graph each model. Use the Intersect feature on the graphing calculator to find the solution of the system. The solution is $x = 99.72093$ and $y = 42.00168$.




The linear model shows that if the table's trends continue, the times for men and women will be equal about 100 years after 1968, in 2068. The winning time will be about 42 seconds.

## Exercise

**8.** The table shows the winning times for Olympic 500-M speed skating. Assuming these trends continue, when will the women's winning time equal the men's winning time? What will that winning time be? **2028; 31.265 seconds**

**Winning Times for the Olympic 500-M Speed Skating (seconds)**

| Year | 1968 | 1972 | 1976 | 1980 | 1984 | 1988 | 1992 | 1994 | 1998 |
|---|---|---|---|---|---|---|---|---|---|
| Men's Times | 40.30 | 39.44 | 39.17 | 38.03 | 38.19 | 36.45 | 37.14 | 36.33 | 35.59 |
| Women's Times | 46.10 | 43.33 | 42.76 | 41.78 | 41.02 | 39.10 | 40.33 | 39.25 | 38.21 |

SOURCE: International Olympic Committee