

Part 1: Determine the exact time and distance Bald Biker and Howard will be when tied in the trike race.



What's In My Pocket?



I have 20 coins in my pocket. The coins are quarters and dimes. The total amount of money is \$3.05. What could be in my pocket?

How would you figure this out?

$$\begin{array}{r|l}
 2Q = 50¢ & \text{ODD \#} \\
 4Q = \$1.00 & \text{QUARTERS} \\
 \$1.50 \leftarrow 15 & 5 \rightarrow \$1.25
 \end{array}$$

Define our variables:

$$D = \# \text{ DIMES}$$

$$Q = \# \text{ QUARTERS}$$

Find two totals mentioned in the problem:

$$= 20 \text{ COINS}$$

$$= \$3.05$$

Using the above totals and variables, write a system of equations that represents the amount of money in your pocket:

$$D + Q = 20 \leftarrow \text{COINS}$$

$$0.10D + 0.25Q = \$3.05 \leftarrow \text{MONEY}$$



$$10D + 25Q = 305$$

Solving the system of linear equations by ELIMINATION.

Elimination Method: A way to solve a linear system in which the two equations are added and a variable eliminates.

Solving the system by elimination:

What is our system:

$$\begin{aligned} -10(D + Q) &= -20 \\ 10D + 25Q &= 305 \end{aligned}$$

$$\begin{aligned} -10D + -10Q &= -200 \\ + 10D + 25Q &= 305 \end{aligned}$$

$$\frac{15Q}{15} = \frac{105}{15}$$

$$Q = 7$$

$$D + Q = 20$$

$$D + 7 = 20$$

$$\begin{aligned} -7 & -7 \end{aligned}$$

$$D = 13$$

(13, 7)

Steps to Solving a Linear System by Elimination

1. DECIDE WHICH VARIABLE YOU WANT TO ELIMINATE
2. IN ORDER TO ELIMINATE VARIABLE, THE COEFFICIENTS MUST BE OPPOSITES.
* IF NOT OPPOSITES, THEN AT LEAST ONE EQUATION MUST BE MULTIPLIED BY A VALUE SO THAT THE COEFFICIENTS ARE OPPOSITES.
3. ADD THE EQUATIONS: A VARIABLE SHOULD CANCEL.
4. SOLVE FOR VARIABLE.
5. SUBSTITUTE KNOWN VALUE INTO EITHER ORIGINAL EQUATION TO SOLVE FOR REMAINING VARIABLE.
6. ORDERED PAIR: (x, y)
CHECK ✓

Solve the system of linear equations by elimination. Check your answer and state the type of system.

$$\begin{aligned} 1) \begin{cases} 3x + 2y = 10 \\ -3x + y = -22 \end{cases} &\Rightarrow \begin{aligned} -3x + y &= -22 \\ -3x + y &= -22 \\ +4 & +4 \end{aligned} \\ \hline \begin{aligned} 3y &= -12 \\ \frac{3y}{3} &= \frac{-12}{3} \end{aligned} &\Rightarrow \begin{aligned} -3x &= -18 \\ \frac{-3x}{-3} &= \frac{-18}{-3} \end{aligned} \\ y = -4 & \quad x = 6 \\ (6, -4) & \end{aligned}$$

Type:

CONSISTENT, INDEPENDENT

Check:

$$\begin{aligned} 3x + 2y &= 10 & (6, -4) & \quad -3x + y = -22 \\ 3(6) + 2(-4) &= 10 & -3(6) - 4 &= -22 \\ 18 - 8 & & -18 - 4 &= -22 \\ 10 &= 10 & -22 &= -22 \end{aligned}$$

$$\begin{aligned} 2) \begin{cases} 8x - 6y = 36 \\ -2x + 6y = 0 \end{cases} \\ \hline \end{aligned}$$

Type:

Check:

$$3) \begin{cases} -2x + y = 3 \\ -3x + y = 2 \end{cases}$$

$$4) \begin{cases} -3x + 4y = 12 \\ 2x + y = -8 \end{cases}$$

Type:

Check:

Type:

Check:

Solving special linear systems by elimination. Check your answer and state the type of system.

$$1) \begin{cases} x + y = 5 \\ -3x - 3y = -15 \end{cases} \xrightarrow{\cdot 3} \begin{cases} 3x + 3y = 15 \\ -3x - 3y = -15 \end{cases}$$

$$\begin{array}{r} 3x + 3y = 15 \\ + \quad -3x - 3y = -15 \\ \hline 0 = 0 \end{array}$$

↑
TRUE STATEMENT
INFINITELY MANY SOLUTIONS

Type:

CONSISTENT, DEPENDENT

Check:

X

$$2) \begin{cases} -2x + y = 3 \\ -2x + y = 2 \end{cases} \xrightarrow{\cdot -1} \begin{cases} 2x - y = -3 \\ -2x + y = 2 \end{cases}$$

$$\begin{array}{r} 2x - y = -3 \\ + \quad -2x + y = 2 \\ \hline 0 = -1 \end{array}$$

NOT A TRUE STATEMENT
NO SOLUTION

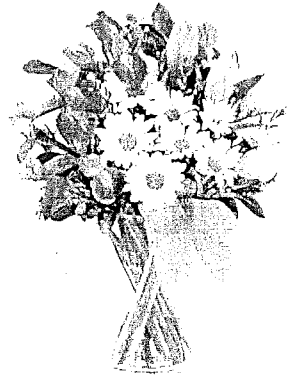
Type:

INCONSISTENT

Check:

Solve the real-world situation by using elimination.

Lindsey spent \$16.30 to buy 16 flowers. The bouquet contained daisies, which cost \$1.75 each, and tulips, which cost \$.85 each. How many of each type of flower did Lindsey buy?



- a) Identify your variables.

$$T = \# \text{ TULIPS}$$

$$D = \# \text{ DAISIES}$$

- b) Write the system of equations that can be used to represent this situation.

$$D + T = 16$$

$$1.75D + 0.85T = \$16.30 \Rightarrow 175D + 85T = 1630$$

$$(D + T = 16) - 175$$



- c) Which variable will you eliminate and how?

$$-175D + -175T = -2800$$

$$175D + 85T = 1630$$

- d) How many of each type of flower did Lindsey buy?

Ticket out the Door

When solving a system of linear equations what method is your favorite: graphing, substitution, or elimination? Why?