

Solving Systems of Equations using Elimination

Solve this system using substitution:

$$12x + 4y = 22$$

$$3x - 8y = -10$$

What issues are you running into?

What is making it difficult?

Is there an easier way to solve?

Elimination

$$3x + y = 5$$

$$2x - y = 10$$

1. Eliminate a variable by adding the equations vertically

What do we need to get two terms to add to 0?

2. Solve for remaining variable

3. Substitute into either original equation to find the other variable

4. Write solution as an ordered pair

$$2x + y = -92$$

$$2x + 2y = -98$$

If we add vertically, does a variable eliminate?

What can we do to MAKE a variable eliminate?

$$2x + 3y = 7$$

$$x + 4y = 9$$

Now there is no obvious choice for elimination, what can you do?

$$12x + 4y = 22$$

$$3x - 8y = -10$$

Re-try the difficult substitution problem using the elimination method!

Solve using elimination

$$4x + 3y = 13$$

$$11x + 4y = -17$$

$$x + y = 4$$

$$-6x + y = 22$$

$$6y = x + 18$$

$$5x - 7y = 31$$

$$2y - x = 6$$

$$-4x + 2y = -14$$

Applications - set up a system of equations and solve by elimination

- 1) Jack and Totsakan are selling flower bulbs for a school fundraiser. Customers can buy bags of windflower bulbs and packages of crocus bulbs. Jack sold 1 bag of windflower bulbs and 3 packages of crocus bulbs for a total of \$65. Totsakan sold 1 bag of windflower bulbs and 13 packages of crocus bulbs for a total of \$235. What is the cost each of one bag of windflower bulbs and one package of crocus bulbs?

- 2) Huong and Mark each improved their yards by planting daylilies and shrubs. They bought their supplies from the same store. Huong spent \$92 on 5 daylilies and 6 shrubs. Mark spent \$106 on 5 daylilies and 8 shrubs. Find the cost of one daylily and the cost of one shrub.

- 3) The school that Rob goes to is selling tickets to the annual talent show. On the first day of ticket sales the school sold 11 senior citizen tickets and 14 student tickets for a total of \$291. The school took in \$171 on the second day by selling 3 senior citizen tickets and 14 student tickets. Find the price of a senior citizen ticket and the price of a student ticket.

- 4) The senior classes at High School A and High School B planned separate trips to Yellowstone National Park. The senior class at High School A rented and filled 1 van and 1 bus with 60 students. High School B rented and filled 1 van and 6 buses with 290 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?