

Math 6d: Homework 27

HW#27 is due May 12; submit to Google classroom 15 minutes before the class time.

Please, write clearly which problem you are solving and show all steps of your solution.

System linear equations, solved by substitution

1. Simplify both equations.
2. From one of the 2 equations, express one of the unknowns (for example, x) in terms of the other one, $x = \dots$
3. Substitute the obtained expression in the other equation - you have an equation with one unknown (linear equation for y).
4. Solve this equation (find y).
5. Substitute the value for the second unknown (the y -value) back in the first equation (in $x = \dots$).

System linear equations, solved by elimination (addition)

1. Simplify both equations.
2. Look for coefficients in front of one of the unknowns, x or y , which are the same.
 - a. If the coefficients are different, try to make them the same by multiplying one or both equations by a number.
3. Add/subtract the two equations so one of the unknowns cancels out.
4. Now, you have one equation with one unknown, solve it.
5. Go back to one of the two initial equations in your system, substitute the unknown you just found, and find the second unknown.

Homework questions

1. Solve the system equation by elimination:

$$\text{a) } \begin{cases} 2x + y = 8 \\ 3x + y = 10 \end{cases}$$

$$\text{b) } \begin{cases} x - 3y = 2 \\ x - 5y = 2 \end{cases}$$

$$\text{c) } \begin{cases} 5y - 2x = 1 \\ 15y - 3x = -3 \end{cases}$$

$$\text{d) } \begin{cases} (2x - 3)(3y - 4) = (2y - 5)(3x + 1) \\ 3(y + 2) - 2(x - 3) = 16 \end{cases}$$

2. Solve the system equations in the most rational way:

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

$$\text{b. } \begin{cases} 5x + 12\frac{y-1}{3} = 6 \\ x + 6\frac{y-1}{3} = 0 \end{cases}$$

3. The ratio of two numbers is 0.8. If we divide the smaller number by 10 and subtract 15 from the larger number, we will get a ratio that is 8 times smaller than the first ratio. Find the two numbers.
4. Find the shortest distance from the origin (0; 0) to the line given by the equation $y = -2x + 8$. [You can use any method you choose]
5. 10. Compute the area of the rectangle ABCD if A is at (0; 0), B at (2; 3), and D at (-6; 8). [It can be done in more than one way.]