Answer on Question #55770 - Math – Algebra

1. Solve the following system of equations algebraically. Verify the solution either graphically or by using matrices.

$3x - y = 0$

$5x + 2y = 22$

2. Solve the following system of equations algebraically. Verify the solution either graphically or by using matrices.

$8x - 2y = 5$

$-12x + 3y = 7$

Solution:

$3x - y = 0$

$5x + 2y = 22$

It follows from the first equation that $y = 3x$

Substitute for $y = 3x$ into the second equation.

$y = 3x$

$5x + 2*3x = 22$

$y = 3x$

$5x + 6x = 22$
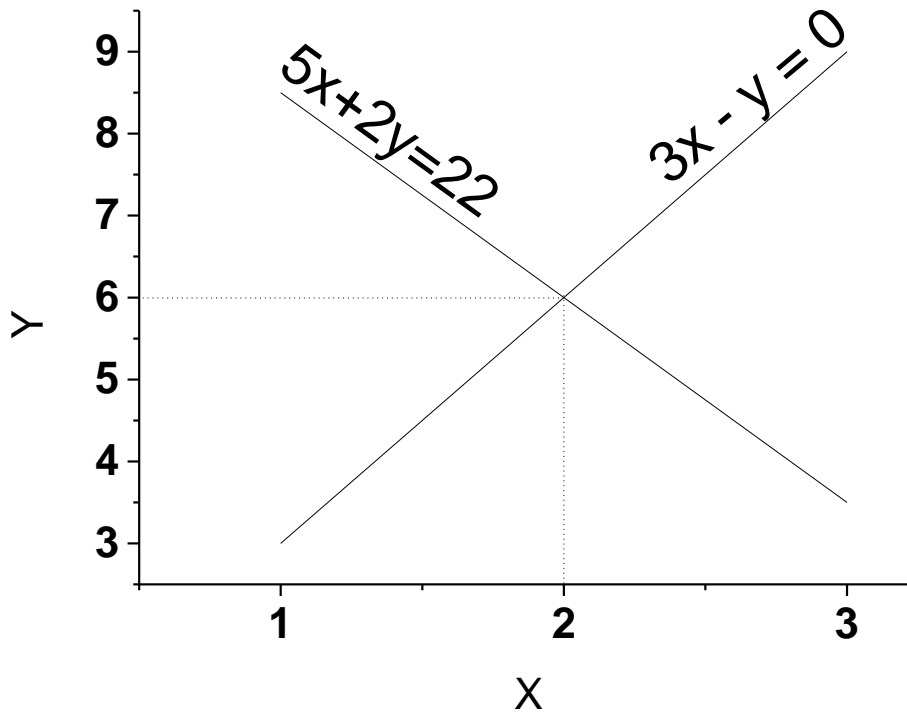
$y = 3x$

$11x = 22$

$y = 3x$

$x = 22/11$

$y = 3x$

$x = 2$

$y = 3 \cdot 2$

$x = 2$

$y = 6$

$x = 2$

Answer:

3x − y = 0   x = 2
5x + 2y = 22   y = 6

2. Express y from the first equation and plug into the second equation.

8x -2y = 5   →   8x - 5 = 2y   →   y = (8x − 5)/2   → y = (8x − 5)/2
-12x + 3y = 7   12x + 7 = 3y   12x + 7 = 3y   12x + 7 = 3·(8x − 5)/2

→ y = (8x − 5)/2
  12x + 7 = 1.5·(8x − 5)
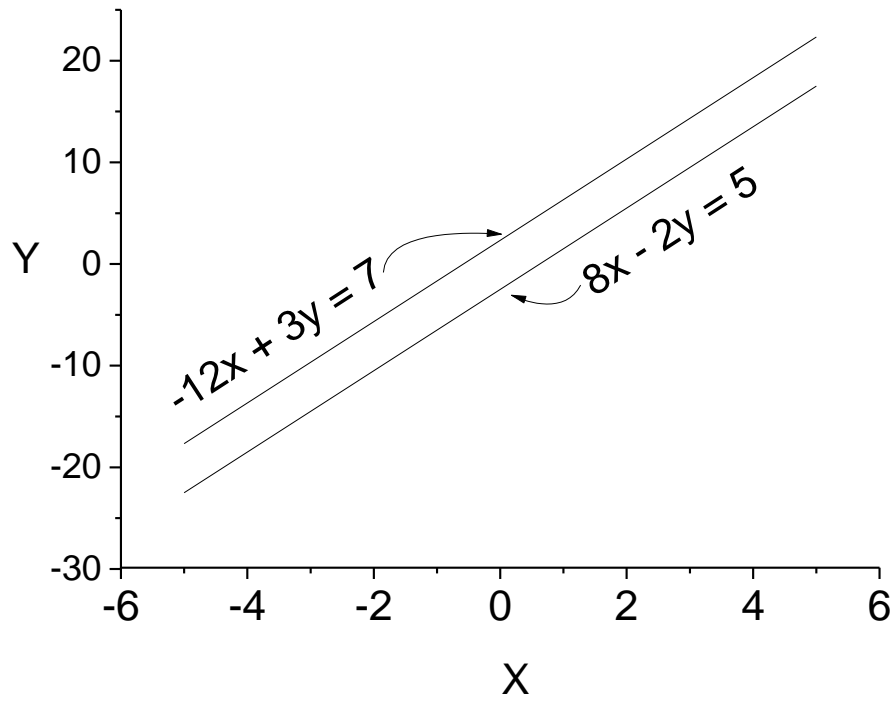
We solve the second equation:
  12x + 7 = 12x − 7.5

  12x − 12x = - 7 − 7.5

    0 = - 14.5

The last equality does not hold, hence the previous equation and the system of equations have no solution.

Answer:

8x -2y = 5   the system of equations has no solution

-12x +3y = 7