7.3 Solving Systems of Linear Equations using Elimination (Linear Combinations)

What is a solution?

the Answer is a Coordinate Pair

How do you solve by graphing?

finding the intersection Point

How do you solve by substitution?

Solve one equation for a variable

Elimination: GET RID OF A VARIABLE

Step 1: ARRANGE the equations with like terms in COLUMNS

Step 2: MULTIPLY one or both of the equations by a number to obtain coefficients that are opposites for one of the VARIABLES

Step 3: ADD the equations from Step 2.

Combining like terms will ELIMINATE one variable. Solve for the remaining variable.

Step 4: SUBSTITUTE the value obtained in Step 3 into either of the original equations and solve for the other VARIABLE

Step 5: CHECK the solution in each of the ORIGINAL equations.

$x - y = 3$

$2x + y = 1$

$\frac{3x}{3} = \frac{4}{3}$

$x = \frac{4}{3}$

$\frac{4}{3} - y = 3$

$-\frac{4}{3} \quad -\frac{4}{3}$

$-y = \frac{3}{1} - \frac{4}{3}$

$-y = \frac{9}{3} - \frac{4}{3}$

$-y = \frac{5}{3}$

$y = -\frac{5}{3}$

$\left(\frac{4}{3}, -\frac{5}{3}\right)$

✓ Step 1: Arrange in columns

Step 2: Multiply to get opposite coefficients

Step 3: ADD & solve for X

Step 4: Substitute $\frac{4}{3}$ in for X to solve for y

$2(3x + y) = (3)2$ 2 opp. -2

$7x + 2y = 1$

$-6x - 2y = -6$

$1x = -5$

$7(-5) + 2y = 3$

$-35 + 2y = 3$

$+35 \quad +35$

$\frac{2y}{2} = \frac{38}{2}$

$y = 19$

$(-5, 19)$

$2x - y = -1$

$2x + y = -7$

$\frac{4x}{4} = \frac{-8}{4}$

$x = -2$

$2(-2) - y = -1$

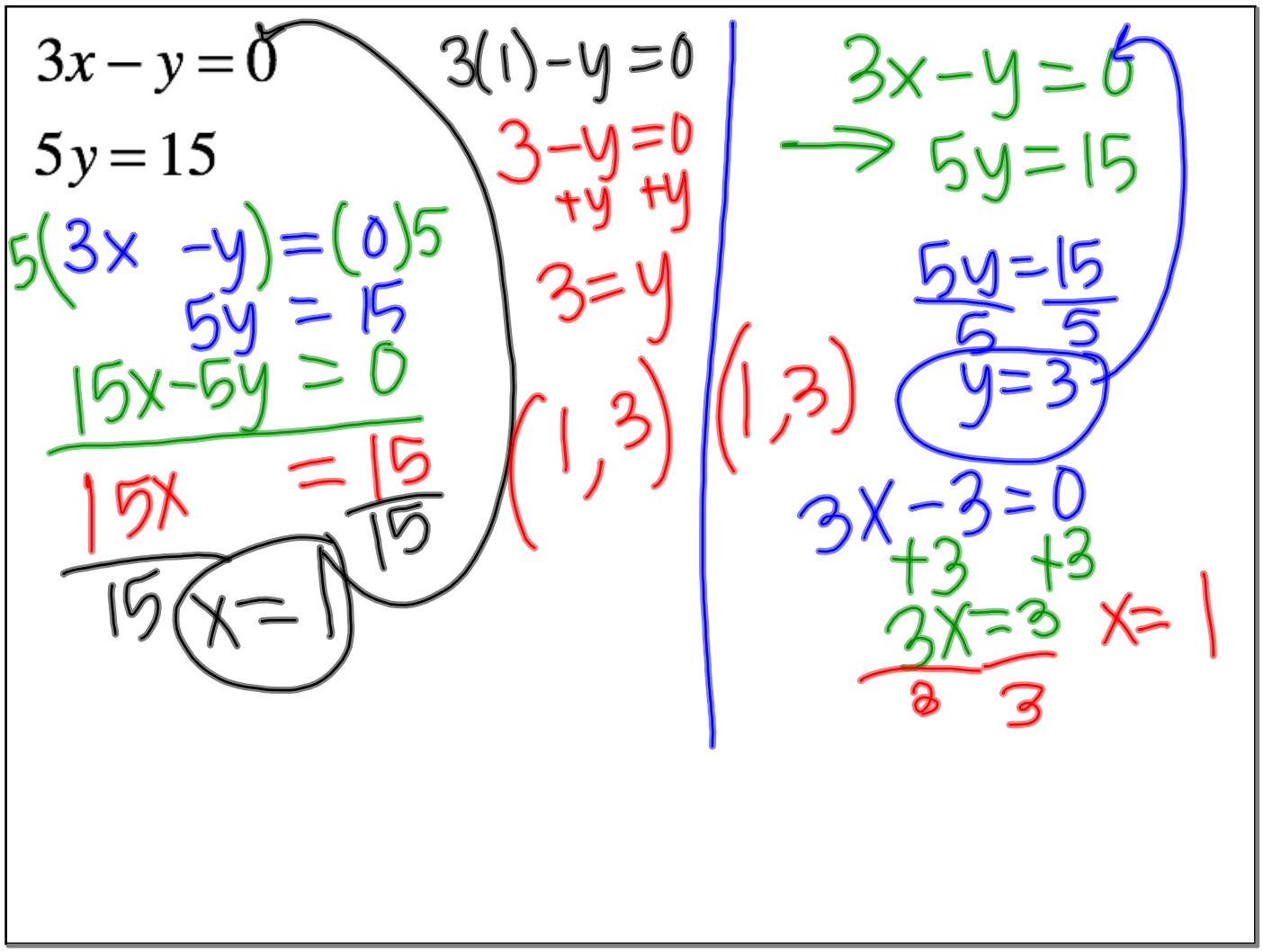
$-4 - y = -1$

$+4 \quad +1$

$-y = 3$

$y = -3$

$(-2, -3)$


3x − y = 0
5y = 15
5(3x − y) = (0)5
5y = 15
15x − 5y = 0
15x = 15
15 15
x = 1
3(1) − y = 0
3 − y = 0
+y +y
3 = y
(1, 3)
3x − y = 0
→ 5y = 15
5y = 15
5 5
y = 3
(1, 3)
3x − 3 = 0
+3 +3
3x = 3
3 3
x = 1

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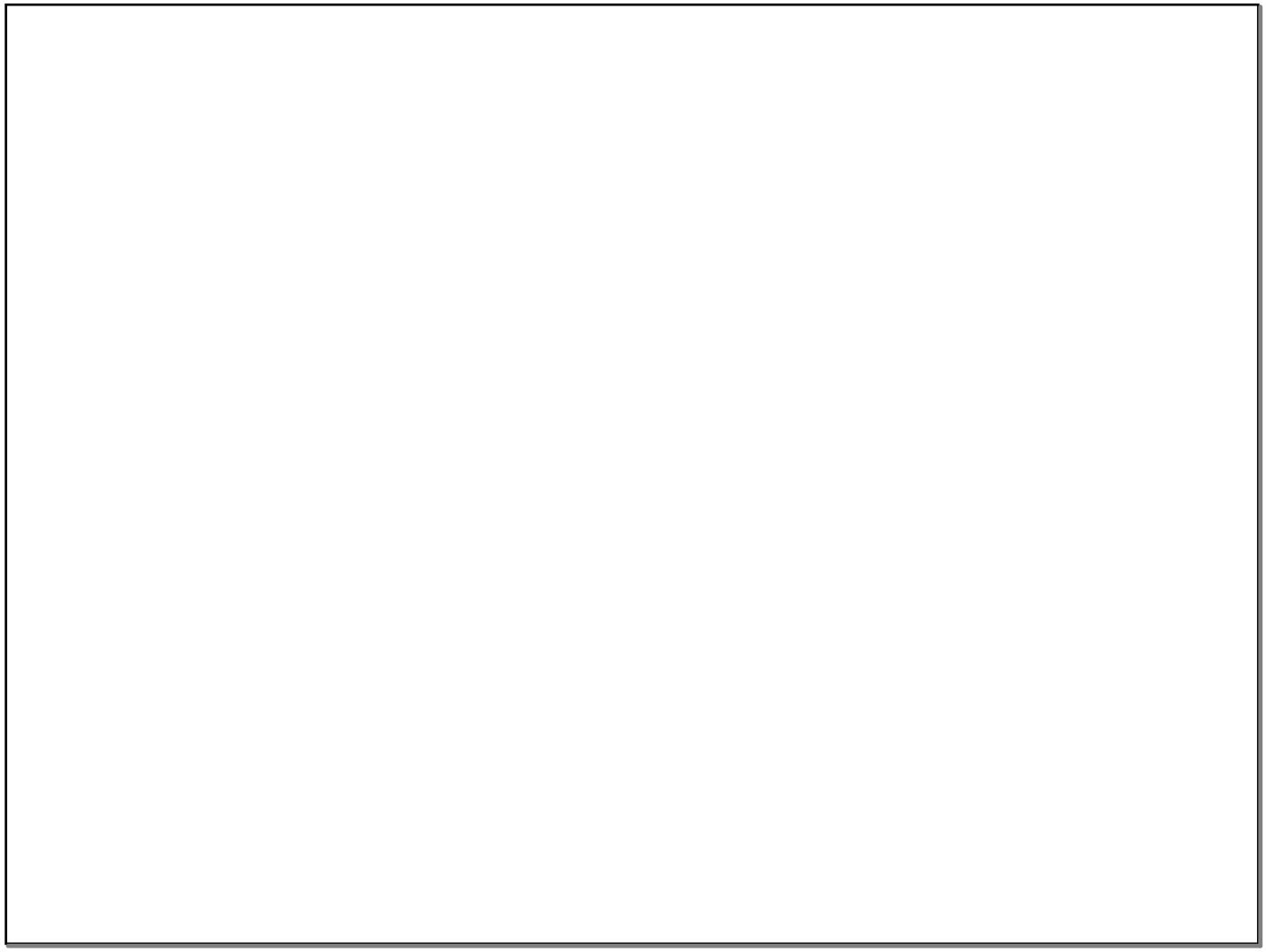

$$y = 1 - x$$

$$2x - y = 2$$