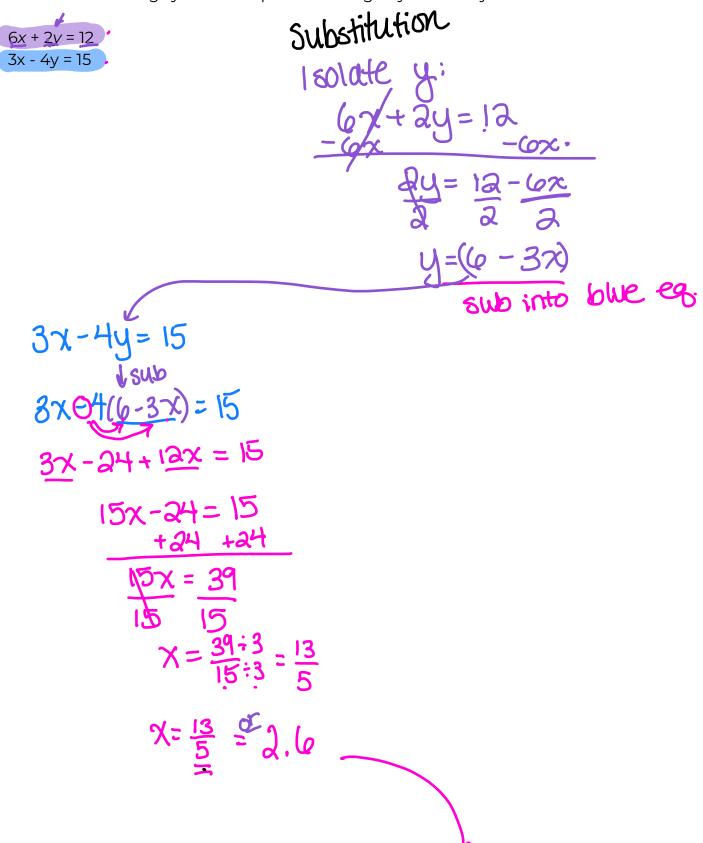# lulumath

Solving Systems of Equations with Non-Integer Solutions

(Video Notes)

Video Link

Solving Systems of Equations with Non-Integer Solutions

Solve the following system of equations using any method you would like.

$6x + 2v = 12$
$3x - 4y = 15$

Substitution

Isolate y:

$$6x + 2y = 12$$
$$-6x \qquad\qquad -6x$$
$$\frac{2y}{2} = \frac{12}{2} - \frac{6x}{2}$$
$$y = (6 - 3x)$$

sub into blue eq.

$$3x - 4y = 15$$

$\downarrow$ sub

$$3x - 4(6 - 3x) = 15$$
$$3x - 24 + 12x = 15$$
$$15x - 24 = 15$$
$$ +24 \quad +24$$
$$\frac{15x}{15} = \frac{39}{15}$$
$$x = \frac{39 \div 3}{15 \div 3} = \frac{13}{5}$$

$$x = \frac{13}{5} = 2.6$$

$6x + 2y = 12$

$6\left(\dfrac{13}{5}\right) + 2y = 12$

$+\dfrac{78}{5} + 2y = 12$

$-\dfrac{78}{5} \qquad\qquad -\dfrac{78}{5}$

$2y = \dfrac{5 \cdot 12}{5 \cdot 1} - \dfrac{78}{5}$

$2y = \dfrac{60}{5} - \dfrac{78}{5}$

$\dfrac{2y}{2} = \dfrac{-\frac{18}{5}}{2} \rightarrow$ by mult.
$\phantom{\dfrac{2y}{2} = } \rightarrow$ recip.

$y = \dfrac{-18}{5} \cdot \dfrac{1}{2} = \dfrac{-9}{5}$

$y = \dfrac{-9}{5}$

Solution: $\left(\dfrac{13}{5}, \dfrac{-9}{5}\right)$

$6x + 2y = 12$

$6(2.6) + 2y = 12$

$15.6 + 2y = 12$

$-15.6 \qquad\qquad -15.6$

$\dfrac{2y}{2} = \dfrac{-3.6}{2}$

$y = -1.8$

* ONLY to convert to decimals, if the decimals terminate! (NO repeating → keep in fractions)

$(2.6, -1.8)$

Solve the following system of equations using any method you'd like.

2c + 5d = 2
2c - 10d = -1

Elimination

$2(2c+5d=2)$
$2c-10d=-1$

LCM of 5,10 = 10

$\longrightarrow$ $(4c + 10d = 4)$
$\longrightarrow$ $+(2c - 10d = -1)$
_____

$\dfrac{6c}{6} = \dfrac{3}{6}$

$C = \dfrac{3 \div 3}{6 \div 3} = \dfrac{1}{2}$

$C = \boxed{\dfrac{1}{2}}$

$\dfrac{2}{1} \cdot \dfrac{1}{2}_1.$

$2c + 5d = 2$
$2(\tfrac{1}{2}) + 5d = 2$
$1 + 5d = 2$
$\underline{-1 \qquad -1}$
$\dfrac{5d}{5} = \dfrac{1}{5}$
$d = \dfrac{1}{5}$

Solution:
$\left(\dfrac{1}{2}, \dfrac{1}{5}\right)$
$c = \dfrac{1}{2}, d = \dfrac{1}{5}$