

$$\begin{array}{l} (12) \quad x + 5y = 4 \rightarrow x + 5y = 4 \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad -5y \quad -5y \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad x = -5y + 4 \end{array}$$

$$3x + 15y = -1$$

$$3(-5y + 4) + 15y = -1$$

$$-15y + 12 + 15y = -1$$

$$12 = -1 \quad \times$$

$$12 = -1 \quad \times$$

★ if all variables cancel,
and EQ is false...

NO SOLUTIONS

① parallel ② inconsistent

$$\begin{array}{l} (15) \quad x - 5y = 10 \rightarrow x - 5y = 10 \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad +5y \quad +5y \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad x = 5y + 10 \end{array}$$

$$2x - 10y = 20$$

$$2(5y + 10) - 10y = 20$$

$$10y + 20 - 10y = 20$$

$$20 = 20$$

$$20 = 20$$

★ all variables cancel,
and EQ is true...

INFINITE SOLUTIONS

① consistent dependent ② same line!

ELIMINATION

Clear Learning Target

You will be able to use the elimination method to solve systems of linear equations algebraically.

Example #1: Solve.

$$(5, 2)$$

matching coefficients w/ opposite signs...
ADD equations

$$4x + 6y = 32$$

$$+ 3x - 6y = 3$$

$$7x + 0y = 35$$

$$\frac{7x = 35}{7} \\ x = 5$$

$$4(5) + 6y = 32$$

$$20 + 6y = 32 \\ -20 \quad -20$$

$$\frac{6y = 12}{6} \\ y = 2$$

Example #2: Solve.

same coefficients & same sign...
subtract!

$$2x + 5y = 6$$

$$- 2x + 9y = 22$$

$$0x - 4y = -16$$

$$\frac{-4y = -16}{-4} \\ y = 4$$

$$2x + 5(4) = 6$$

$$2x + 20 = 6 \\ -20 \quad -20$$

$$\frac{2x = -14}{2} \\ x = -7$$

$$(-7, 4)$$

You Try! Solve.

$$\begin{array}{r}
 -4x + 3y = -3 \\
 + 4x - 5y = 5 \\
 \hline
 \cancel{0x} - 2y = 2 \\
 -2y = 2 \\
 \frac{-2y}{-2} = \frac{2}{-2} \\
 \boxed{y = -1}
 \end{array}$$

$4x - 5(-1) = 5$
 $4x + 5 = 5$
 $-5 - 5$
 $4x = 0$
 $\frac{4x}{4} = \frac{0}{4}$
 $\boxed{x = 0}$

$(0, -1)$

Example #3: Solve.

$$8b + 3c = 11$$

$$7c + 8b = -5$$