Systems of Equations - Substitution

SE2

Substituting an expression from one equation for a variable in another equation

Steps:

1) Solve one of the equations for one of its variables (when possible choose a variable with a coefficient of one or negative one)

2) Substitute the expression from step one into the other equation and solve for the other variable

3) Substitute the value from step two into an original equation and solve.

4) Check your answer (x,y) in BOTH original equations

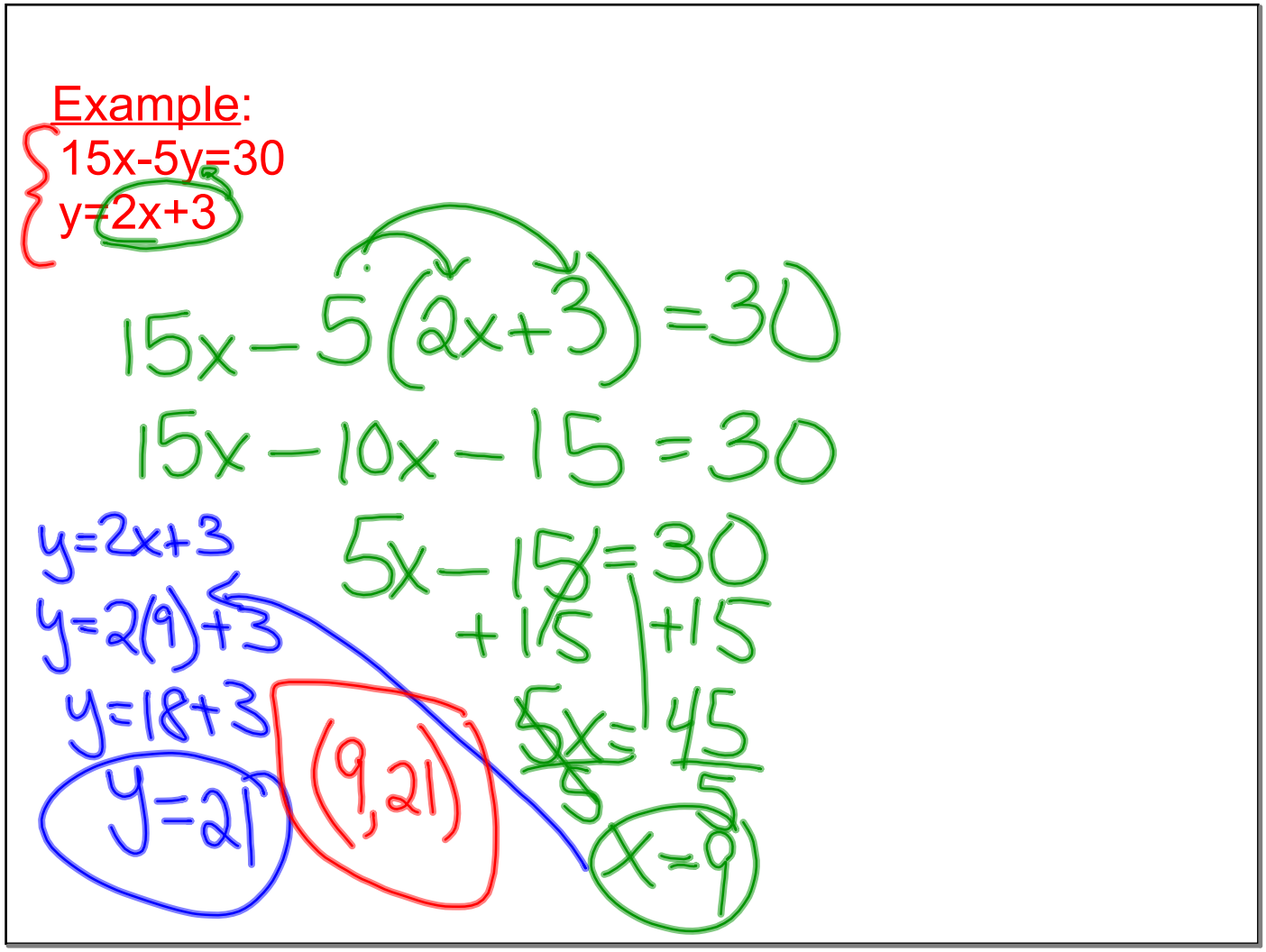
Example:

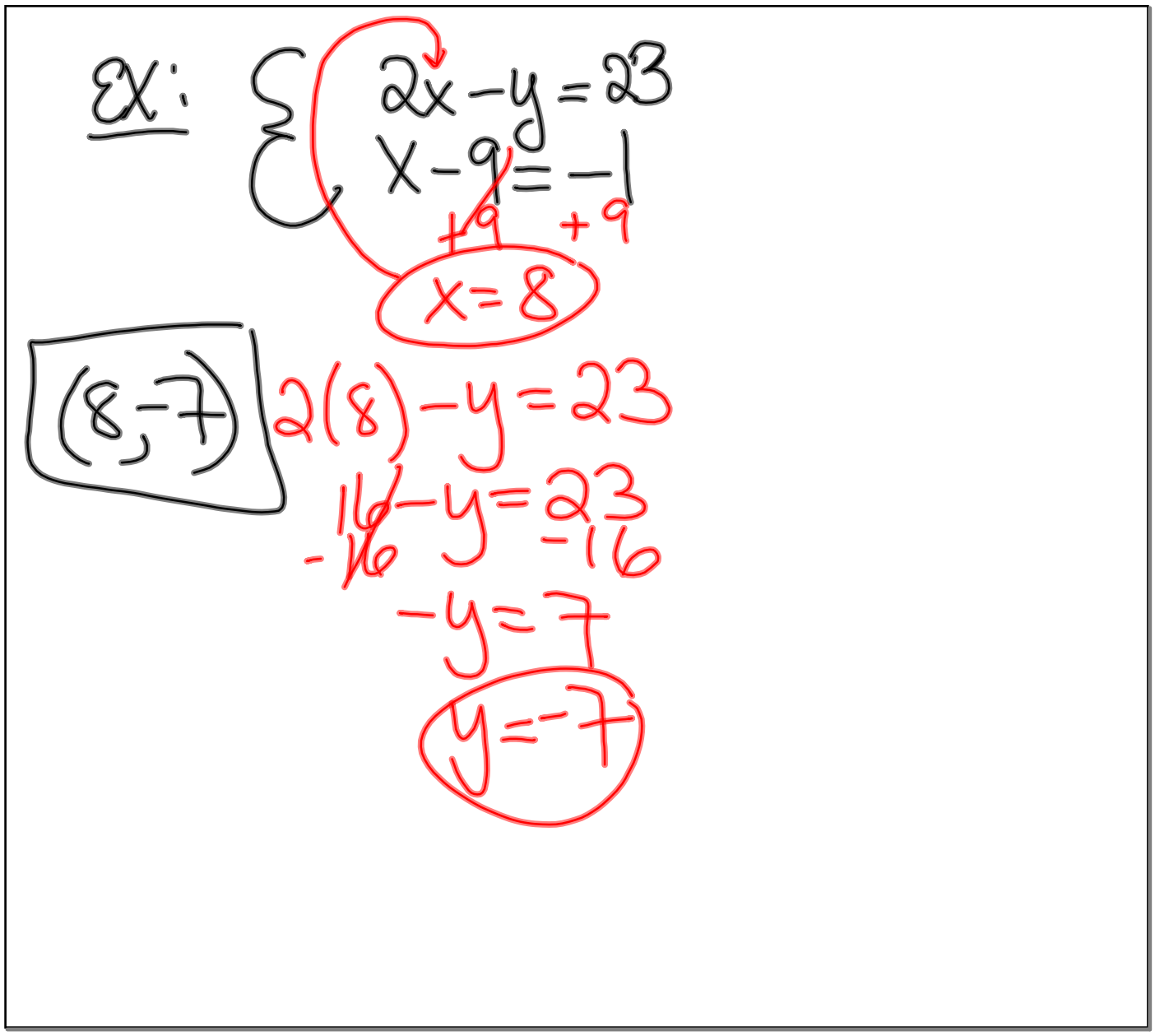
$$\begin{cases} 8x + 2y = 19 \\ x = 3 \end{cases}$$

plug the value for x from one equation into the other equation & solve for y

$$8(3) + 2y = 19$$
$$24 + 2y = 19$$
$$-24 \qquad -24$$
$$2y = -5$$
$$y = -2.5$$

x=3, y=-2.5 Solution: (3, -2.5)


Example:
15x-5y=30
y=2x+3
15x-5(2x+3)=30
15x-10x-15=30
5x-15=30
+15 +15
5x=45
5 5
x=9
y=2x+3
y=2(9)+3
y=18+3
y=21
(9,21)


Ex:
2x − y = 23
x − 9 = −1
+9 +9
x = 8
(8, −7)
2(8) − y = 23
16 − y = 23
−16 −16
−y = 7
y = −7