6.2 Examples – Day 1 – Solve each system of equations using the substitution method

1. $y = 2x$
   $7x - y = 15$

   $7x - (2x) = 15$

   $5x = 15$

   $x = 3$

   $y = 2(3)$

   $y = 6$

   $\boxed{(3, 6)}$

2. $7x - 8y = 112$
   $y = -2x + 9$

   $7x - 8(-2x + 9) = 112$

   $7x + 16x - 72 = 112$

   $23x - 72 = 112$
   $\quad\;\; +72 \;\; +72$

   $\dfrac{23x}{23} = \dfrac{184}{23}$

   $x = 8$

   $y = -2(8) + 9$

   $y = -7$

   $\boxed{(8, -7)}$

What does the x-value represent? The x part of the lines crossing. $(\underline{x}, y)$

What does the y-value represent? The y part of the lines crossing. $(x, \underline{y})$

3. $4x + y = -2$
   $-2x - 3y = 1$

   When you select a variable to solve for, what are your possible choices?

   X or Y

   Which variable appears easier to solve for? Explain.

   The 1ˢᵗ equation, the y appears to be the easiest to solve for because it has a coefficent of 1.

Solve each system of equations using the substitution method. In your first step, please look for the equation and the variable that appears to be the simplest to solve.

4. $x - 3y = 14$

$\boxed{(2, -4)}$

$x - 2 = 0$
$\quad +2 \quad +2$

$\boxed{x = 2}$

$2 - 3y = 14$
$-2 \qquad -2$

$\dfrac{-3y}{-3} = \dfrac{12}{-3}$

$y = -4$

5. $y = 3x$

$y = 3(-8)$

$x + y = -32$

$y = -24$

$x + 3x = -32$

$\dfrac{4x}{4} = \dfrac{-32}{4}$

$\boxed{(-8, -24)}$

$x = -8$

6. $y = x$ $y = 3$

$2y = x + 3$

$2x = x + 3$
$-x \quad -x$

$x = 3$

$\boxed{(3, 3)}$

7. $x - y = 1$

$x = \dfrac{1}{2}(2) + 2$

$x = \left(\dfrac{1}{2}y + 2\right)$

$x = 1 + 2$

$x = 3$

$\dfrac{1}{2}y + 2 - y = 1$

$-\dfrac{1}{2}y + 2 = 1$
$\qquad -2 \quad -2$

$\boxed{(3, 2)}$

$-2 \cdot -\dfrac{1}{2}y = -1 \cdot -2$

$y = 2$

If we were to graph each of these systems, explain what they would look like?

All of these graphs would cross 1 time. They have only 1 solution.