

Name: KEY

Section 4.2a – Solving Systems by the Substitution Method

Solve the systems of equation given below by using the addition method

$$y = -x + 1 \quad \text{and} \quad x - 3y = 9$$

sub
this in

$$x - 3(-x + 1) = 9 \rightarrow x + 3x - 3 = 9$$

$$4x = 12$$

$$x = 3$$

$$y = -3 + 1$$

$$y = -2$$

$$(3, -2)$$

$$4x - y = 5 \quad \text{and} \quad 2x + y = -5$$

↓

-2x -2x

$$4x - (-2x - 5) = 5$$

$$y = -2x - 5$$

$$4x + 2x + 5 = 5$$

$$y = -5$$

$$6x = 0$$

$$x = 0$$

$$(0, -5)$$

$$3x - 4y = 20 \quad \text{and} \quad 3x - 4y = 8$$

$$-4y = -3x + 8$$

$$y = \frac{3}{4}x - 2$$

$$3x - 4\left(\frac{3}{4}x - 2\right) = 20$$

$$3x - 3x + 8 = 20$$

$$8 = 20$$

NO SOLUTION

$$y = -\frac{2}{3}x + 1 \quad \text{and} \quad 2x + y = 7$$

$$2x + -\frac{2}{3}x + 1 = 7$$

$$6x - 2x + 3 = 21$$

$$4x + 3 = 21$$

$$4x = 18$$

$$x = \frac{18}{4} = \boxed{\frac{9}{2}}$$

$$y = -\frac{2}{3}\left(\frac{9}{2}\right) + 1$$

$$y = -3 + 1$$

$$y = -2$$

$$\left(\frac{9}{2}, -2\right)$$