Math 109 College Algebra **Fall 2024**
Lecturer: Calvin Hotchkiss **TA: Samir Donmazov**
Group Worksheet 7

WS #7 Solutions

Indicate which group member is taking on which of the following four roles. You will switch roles on the next recitation day.

Reader: Reads the problem to the group and makes sure everyone understands.
Spokesperson: presents the work and asks questions to the TA.
Recorder: writes everyone's names and the group's work on the worksheet.
Timekeeper: keeps track of time.

Reader's name: _____
Spokesperson's name: _____
Recorder's name: _____
Timekeeper's name: _____

Solve the following systems of equations by substitution. Give your solution as an ordered pair (x, y). Show your work, and make sure to check your answers.

1.

$$\begin{cases} x + 4y = 5 & 1) \\ 2x + 4y = 2 & 2) \end{cases}$$

Solve 1) for "x" in terms of "y", then plug it into 2) to solve for "y". Then, go back to 1) to solve for "x":

1) $x + 4y = 5 \xrightarrow{-4y \quad -4y} \boxed{x = 5 - 4y}$ → 2) $2x + 4y = 2$

$\Rightarrow 2 \cdot (5 - 4y) + 4y = 2 \Rightarrow 10 - 8y + 4y = 2$

$\Rightarrow 10 - 4y = 2 \Rightarrow 10 - 2 = 4y \Rightarrow 4y = 8 \Rightarrow y = 2$

From 1) $x = 5 - 4 \cdot 2 = 5 - 8 = -3$

2.

$$\begin{cases} 2 = 4x + 5y & 1) \\ 5 = x + y & 2) \end{cases}$$

From 2) $x = 5 - y \Rightarrow$ 1) $2 = 4 \cdot (5 - y) + 5y$

$\Rightarrow 2 = 20 - 4y + 5y \Rightarrow 2 = 20 + y \Rightarrow y = -18$

$$\begin{cases} y = 2x - 3 & 1) \\ y = 5 - 3x & 2) \end{cases}$$

Make 1) equal to 2) since both are "y":

$2x - 3 = 5 - 3x \Rightarrow 5x = 8 \Rightarrow x = \frac{8}{5}$