Math 109 College Algebra **Fall 2024**
Lecturer: Calvin Hotchkiss **TA: Samir Donmazov**
Group Worksheet 8

WS #8 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: _____

1. Solve the following systems of equations by substitution. If the system has one solution, give it as an ordered pair (x, y). If it has no solution or an infinite number of solutions, say so. Show your work.

(a)

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

$1) \Rightarrow y = 2 - 3x \Rightarrow 2) \quad 2x - (2 - 3x) = 5$

$\Rightarrow 2x - 2 + 3x = 5 \Rightarrow 5x = 7 \Rightarrow x = \frac{7}{5}$

(b)

$$\begin{cases} x + 4y = 5 \\ 2x + 8y = 2 \end{cases}$$

1) $\Rightarrow x = 5 - 4y \Rightarrow$ 2) $2(5 - 4y) + 8y = 2$

$\Rightarrow 10 - 8y + 8y = 2 \Rightarrow 10 = 2$, but this not true!

Thus, the system of two equations does not have a solutions.

(c)

$$\begin{cases} 2 = 4x + 5y \\ 4 - 8x = 10y \end{cases}$$

1) $\Rightarrow 2 - 4x = 5y \Rightarrow y = \frac{2 - 4x}{5} \Rightarrow$ 2) $4 - 8x = \frac{10}{5} \cdot \frac{2 - 4x}{5}$

$\Rightarrow 4 - 8x = 2 \cdot (2 - 4x) \Rightarrow 4 - 8x = 4 - 8x \Rightarrow 4 = 4$

which is true (always), so the system has infinitely many solutions!

2. Let $f(x) = \sqrt{x - 2}$. Find the average rate of change of $f(x)$ on $[3, 6]$.

$$f_{AROC,[3,6]} = \frac{f(6) - f(3)}{6 - 3} = \frac{2 - 1}{3} = \frac{1}{3}$$

where $f(6) = \sqrt{6 - 2} = \sqrt{4} = 2$, $f(3) = \sqrt{3 - 2} = \sqrt{1} = 1$