Name:____ Date:_____________

PCH: Solving Multivariable Linear Systems Ms. Loughran

Do Now

Solve each of the following systems algebraically:

1. $8x - 4y = 4$
$-2\,(4x - 2y = 2)$

infinitely many solutions

$8x - 4y = 4$
$-8x + 4y = -4$
$0 = 0$

2. $2\,(3x - 6y = 9)$
$3\,(-2x + 4y = 1)$

$\varnothing$

$6x - 12y = 18$
$-6x + 12y = 3$
$0 \neq 21$

3. Solve algebraically:
A $x - 2y + 3z = 9$
B $-x + 3y = -4$
C $2x - 5y + 5z = 17$

$-5A + 3C$ to eliminate z

$-5x + 10y - 15z = -45$
$6x - 15y + 15z = 51$

D $x - 5y = 6$
$-x + 3y = -4$

$-2y = 2$
$y = -1$

D + B to eliminate x

(x, y, z)
$(1, -1, 2)$

D
$x + 5 = 6$
$x = 1$

A $1 + 2 + 3z = 9$
$3z = 6$
$z = 2$

Answer is an ordered triple (x, y, z)

Remember for a system of linear equations, exactly one is true:

1. There is exactly one solution
2. There are infinitely many solutions.
3. There is no solution.

For 1-5, solve the system of linear equations.

1.
$$\begin{aligned} A\quad & 3x-2y+4z=1 \\ B\quad & x+y-2z=3 \\ C\quad & 2x-3y+6z=8 \end{aligned}$$

A+2B to eliminate z

$$\cancel{\begin{aligned} 3x-2y+4z&=1 \\ 2x+2y-4z&=6 \\ \hline 5x&=7 \\ x&=7/5 \end{aligned}}$$

↑ you would have to plug this x into a different pair of original eqs

-2B+C to eliminate x

$$\begin{aligned} -2x-2y+4z&=-6 \\ 2x-3y+6z&=8 \\ \hline D\quad -5y+10z&=2 \end{aligned}$$

-3B+A to eliminate x

$$\begin{aligned} -3x-3y+6z&=-9 \\ 3x-2y+4z&=1 \\ \hline E\quad -5y+10z&=-8 \end{aligned}$$

impossible

$\emptyset$

Homework 01-08

(Remember answers are not unique)

① $y = \dfrac{3x+15}{x-2}$

③ $y = \dfrac{x^2-x-2}{x-5}$

② $y = \dfrac{-4x^2+1}{x^2-9}$

④ $y = \dfrac{2x^2-14x+20}{x^2-4x-5}$