Introduction to Systems

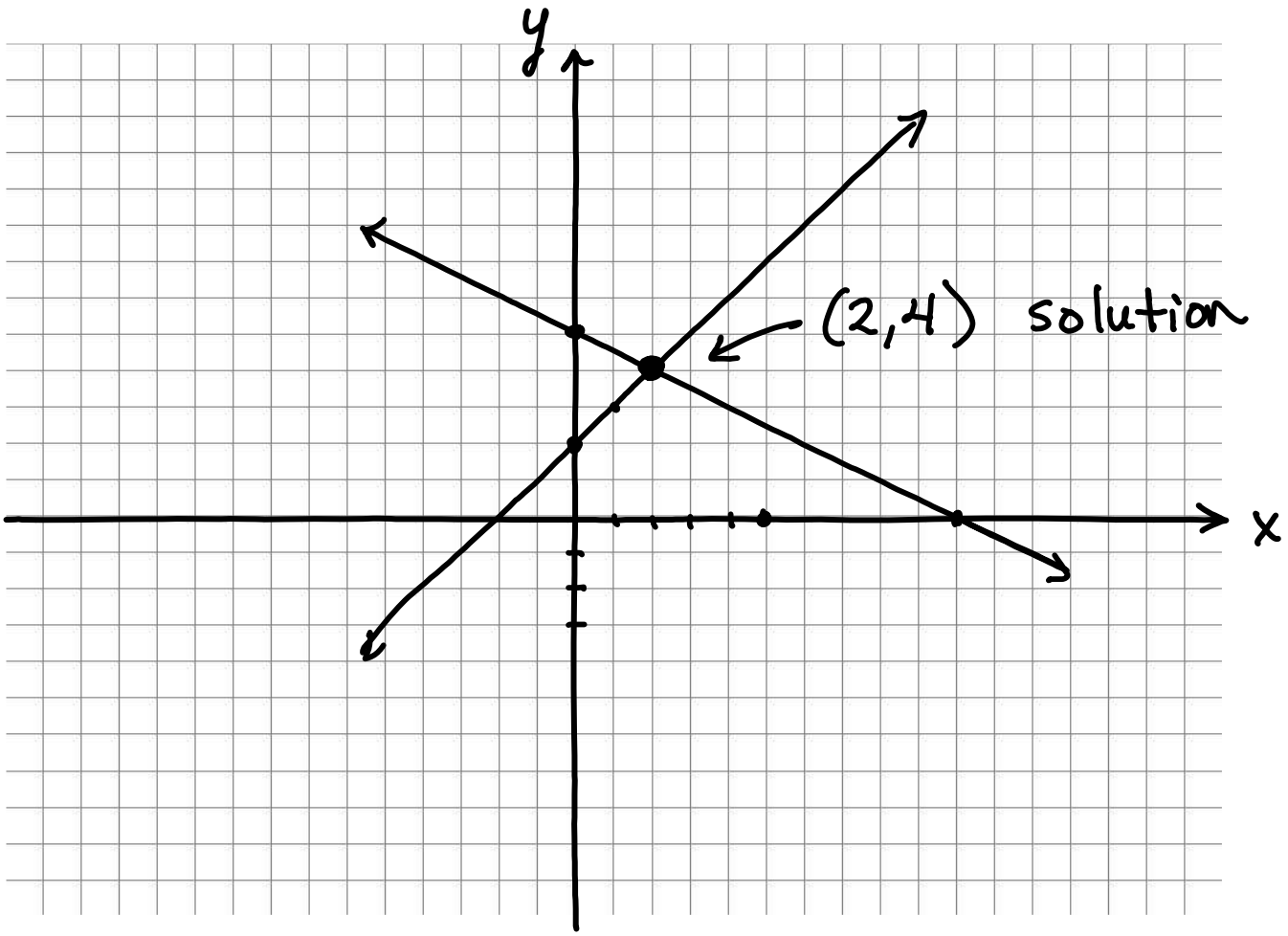
Chapter Review

Solve Systems by Graphing

- Graph the lines in the system
- The point where the lines intersect is the solution (2,4)

Example,

Solve the system by graphing $\begin{cases} y - x = 2 \\ 2y + x = 10 \end{cases}$



Substitution Method

Steps

1. Solve for one variable in one equation
2. Substitute into the other equation - making one equation with one variable
3. Solve the one variable equation
4. Use the solution to solve for other variable

Example,

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

$y - x = 2$

$\boxed{y = x + 2}$ step 1

$\boxed{y = (x+2)}$ step 2

$2y + x = 10$

$2(x+2) + x = 10$

$2x + 4 + x = 10$

$3x + 4 = 10$

$3x = 6$

$\boxed{x = 2}$ Step 3

$x = 2$

$y = x + 2$

$y = 2 + 2 = 4 \longrightarrow \boxed{y = 4}$

the solution is $(2, 4)$

Linear Combination Method

Steps

1. Line up respective variables in column
2. If needed multiply one or both equations by a number(s) to create two terms that are opposite
3. Add the equations to eliminate a term
4. Solve the one variable equation
5. Use the solution to solve for the other variable

$$\begin{aligned} y - x &= 2 \\ 2y + x &= 10 \end{aligned}$$ ← step 1

$$\begin{aligned} y - x &= 2 \\ 2y + x &= 10 \end{aligned}$$ ← step 2 - the x terms are opposite, they will cancel when the equations are added

step 3 add the columns →

$$\begin{aligned} y - x &= 2 \\ 2y + x &= 10 \\ \hline 3y &= 12 \end{aligned}$$

$3y = 12$ } step 4

$y = 4$

Step 5 use $y = 4$ to find x

$y - x = 2$

$4 - x = 2$

$x = 2$

solution $(2, 4)$

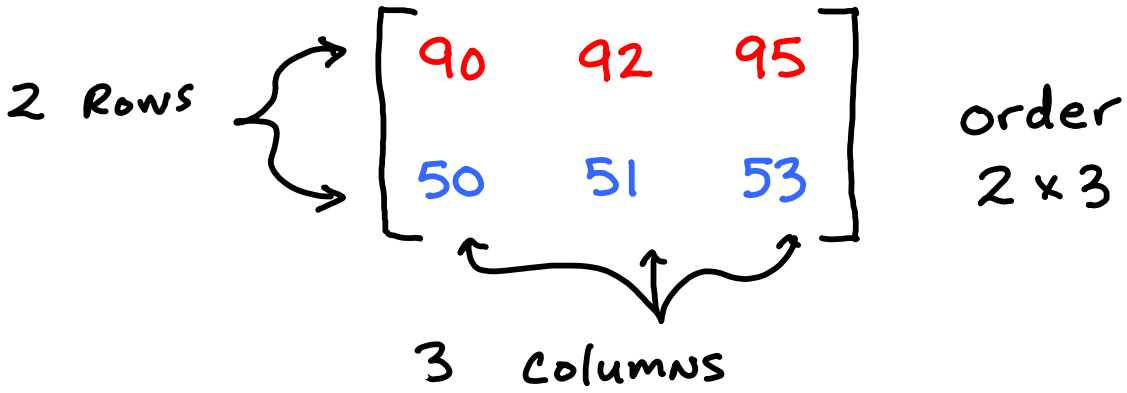
Introduction to Matrices

a matrix is a way to organize information (data) in rows and columns

Temperature for these days

	M	W	F
Hi	90	92	95
Low	50	51	53

order is the size of a matrix



Matrix Operations

You can $+, -, \times, \div$ matrices

however, certain conditions apply

Adding / Subtracting Matrices - must have same size.

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 0 & 9 \end{bmatrix} + \begin{bmatrix} 3 & 9 & -1 \\ 1 & 2 & 5 \end{bmatrix} = \begin{bmatrix} 4 & 11 & 2 \\ 5 & 2 & 14 \end{bmatrix}$$

add respective entries

Scalar multiplication (a number x matrix)

$$3\begin{bmatrix} 1 & 5 \\ 6 & 3 \end{bmatrix} = \begin{bmatrix} 3 & 15 \\ 18 & 9 \end{bmatrix}$$

multipy 3 to all entries