

## Chapter 4.1 Solving Linear Eq'ns by Graphing

A system of 2 linear equations -

A solution to a system of equations -

Ex) Decide whether the ordered pair  $(4, -1)$  is a solution of the system

$$\begin{aligned} 5x + 6y &= 14 \\ 2x + 5y &= 3 \end{aligned}$$

Element of the solution set

Solutions

- ①
- ②
- ③

Types of Solutions

① Consistent system of equations

② Inconsistent system of equations

Types of solutions

① Independent Equations

Ⓐ

Ⓑ

② Dependent Equations

Ⓐ

Ⓑ

## Solutions Summary

(A)

(B)

(C)

## Methods of solution

① Graphing

②

③

## Graphing

goal

(A)

(B)

(C)

## Graphing Method

①

②

③

$$\text{(eg)} \begin{aligned} 5x - 3y &= 9 \\ x + 2y &= 7 \end{aligned}$$

$$\text{(eg)} \begin{aligned} 3x + 5y &= 20 \\ 2x - 5y &= 5 \end{aligned}$$

# Graphing Method Pros & Cons

Pros

Cons

$$\textcircled{a} \begin{cases} 2x + 3y = 6 \\ x - 4y = -8 \end{cases}$$

$$\textcircled{a} \begin{cases} 4x - 3y = 6 \\ -8x + 6y = -12 \end{cases}$$

$$\textcircled{a} \begin{cases} 3x - 6y = -18 \\ x - 2y = 6 \end{cases}$$

$$\textcircled{1} \begin{cases} -x + 3y = 2 \\ 2x - 6y = -4 \end{cases}$$

$$\textcircled{2} \begin{cases} 3x - y = 4 \\ 6x - 2y = 12 \end{cases}$$

$$\textcircled{3} \begin{cases} x - y = 3 \\ x + y = -1 \end{cases}$$

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## Ch 4.2 Solving Linear Equations by Substitution

### Substitution Method

### Substitution Property of Equality

①

②

$$\text{eg) } 2x + 7y = -12$$
$$x = -2y$$

## Substitution Method

①

②

③

④

⑤

⑥

## Pros & cons

## Cons

$$\text{eg) } \frac{1}{2}x + \frac{1}{3}y = -\frac{1}{3}$$
$$\frac{1}{2}x + 2y = -7$$

$$\text{eg) } 2x + 7y = -12$$
$$x = 3 - 2y$$

$$\text{eg) } x + 1 = -4y$$
$$2x - 5y = 11$$

## Conditional Solutions

## Identities

eg  $-x - 3y = 7$   
 $4x + 12y = -28$

## Contradiction

eg  $y = 8x + 4$   
 $16x - 2y = 8$

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## Ch 4.3 Solving Linear Equations by Elimination

### Elimination Method

①

② a

b

②

a

b

### Summary

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## Elimination Method

①

②

③

④

⑤

⑥

⑦

⑧

⑨

$$\textcircled{\text{eg}} \begin{cases} x+2=-3y \\ 2x=y+10 \end{cases}$$

$$\textcircled{\text{eg}} \begin{cases} 4x-5y=-18 \\ 3x+2y=-2 \end{cases}$$

Pros

Cons

Note

$$\textcircled{\text{eg}} \begin{cases} \frac{x+3}{5} - \frac{y-1}{2} = \frac{9}{5} \\ \frac{x-2}{3} + \frac{y-2}{5} = \frac{2}{15} \end{cases}$$

$$\textcircled{\text{eg}} \begin{cases} 0.3x-0.7y=2.93 \\ 0.6x-0.02y=0.58 \end{cases}$$

# Chapter 4.4 Applications of Linear Systems

## Solving Applied Problems

①

②

③

④

⑤

⑥

⑦

Supply

Demand

Equilibrium

Eq

### **Supply and demand.**

The weekly supply and demand equations for packages of computer disks manufactured by Software Supplies, Inc., are

Supply:  $-5p + q = -71$

Demand:  $-2q + p = 34$

Where  $p$  is the price in dollars per package and  $q$  is the quantity in thousands of packages to be supplied. Determine the equilibrium price and the number of packages that will sell at that price.

Eq

### **Solving a problem about two unknown numbers.**

The two top-selling Disney videos in a recent year were Toy Story and Pocahontas. Together they sold 38 million copies. Pocahontas sold 4 million fewer copies than Toy Story. How many copies of each title were sold?

(Eg)

**Solving a problem about quantities and costs.**

The average movie ticket (to the nearest US dollar) costs \$10 in Geneva and \$8 in Paris. If a group of 36 people from these two cities paid \$298 for tickets to see The Rookie, how many people from each city were there?

(Eg)

**Solving a mixture problem involving percent.**

How many liters of 25% alcohol solution must be mixed with 12% solution to get 13L of 15% solution?

(Eg)

**Solving a problem about distance, rate and time.**

In one hour Ann can row 2 mi against the current or 10 mi with the current. Find the speed of the current and Ann's speed in still water.

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Ch 4.5    Inequalities

Boundary equation,-

Half planes



## Graphing an Inequality

1.

2.

(Eg)  $4x + 3y < 9$

## Multiple Inequalities

- Union

Intersection

(Eg) Graph  $4x + 3y < 9$  and  $3x - 4y \geq 8$

## Systems of Inequalities

(Eg) Solve the system:

$$\begin{aligned} 3x + 3y &\geq -6 \\ x &\leq 3 \\ y &\leq 1 \end{aligned}$$