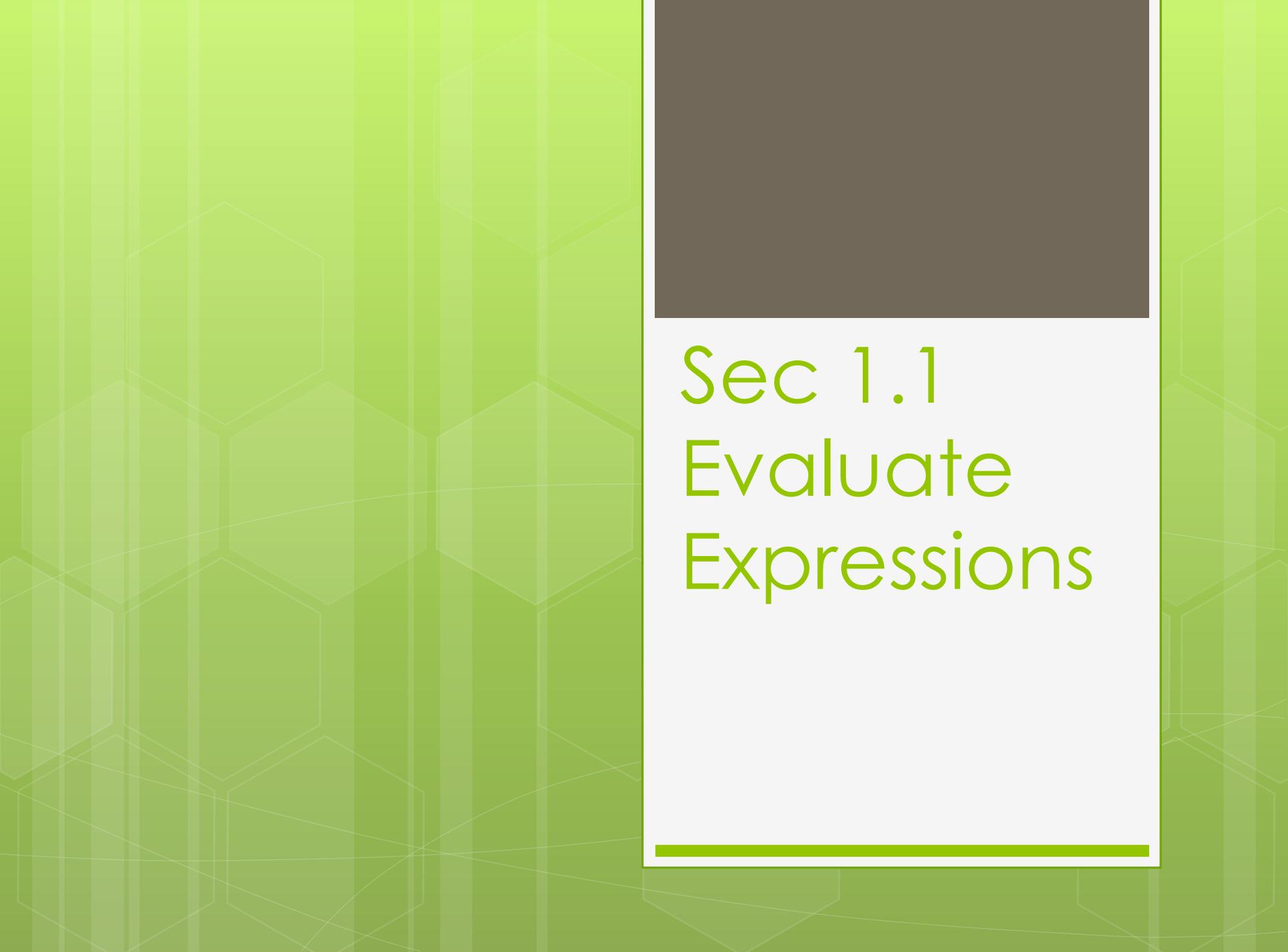


Chapter 1
Expressions,
Equations,
and
Functions



Sec 1.1
Evaluate
Expressions

- **Variable**

- EX:

- **Algebraic Expression** – a collection of _____, _____, and _____ **without an equal sign.**

- EX:

- **Evaluate an Expression** – to substitute a number for each variable and

_____.

- **EX:**
- Evaluate the expression.
 - $0.6x$ when $x = 4$

- $\frac{24}{y}$ when $y = 6$

- $\frac{2}{3}a$ when $a = \frac{1}{2}$

- $b - \frac{1}{2}$ when $b = \frac{5}{6}$

EX: Evaluate the Expression

- You and your friend are going to see a movie. You pay for both admissions. Your total cost (in dollars) can be represented by the expression $2a$, where a is the cost of admission. If each admission costs \$7.75, what is your total cost?

- **Power** – an expression that represents

_____.

- EX:

- **Base** – the big, _____ number

- **Exponent** – the small number that represents _____

_____.

- EX:

EX:

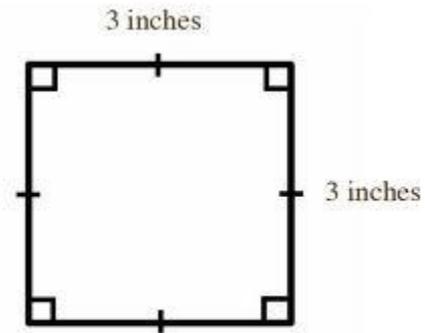
Evaluate the expression.

• x^3 when $x = 8$

• k^2 when $k = 2.5$

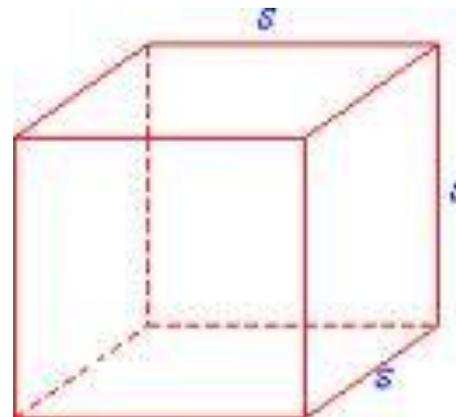
• d^4 when $d = \frac{1}{2}$

- Exponents are used in the formulas for area and volume.
- Area of a Square:



*image not drawn to scale

- Volume of a Cube:

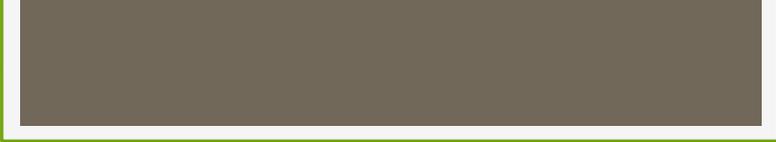
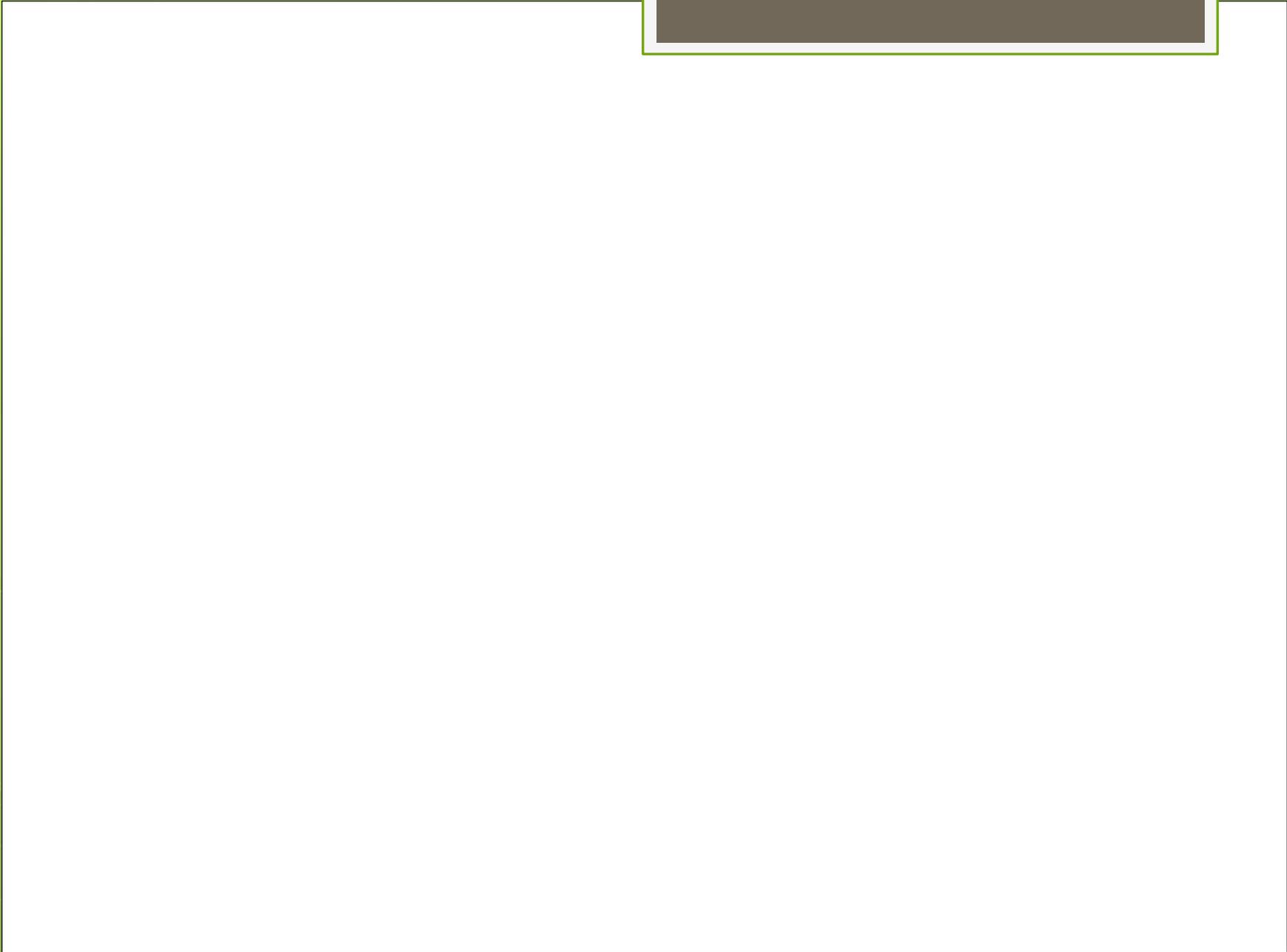


EX:

Each edge of the storage cube shown is 14 inches long. The storage cube is made so that it can be folded flat when not in use.

- Find the area of the storage cube if it is folded flat.
- Find the volume of the storage cube.







Sec 1.2
Apply Order
of
Operations

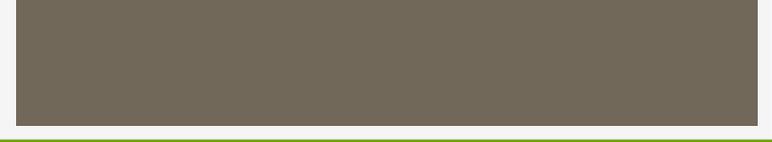
Order of Operations - the correct order for evaluating/simplifying an expression

- **Order of Operations:**
- **P** _____ – simplify expressions inside the parentheses/grouping symbols
- **E** _____ – simplify all powers
- **M** _____ and **D** _____ – left to right
- **A** _____ and **S** _____ – left to right
- **PEMDAS** – “Please Excuse My Dear Aunt Sally”

EX: Evaluate the expressions.

- $27 \div 3^2 \cdot 2 - 3$

- $10 + 2 \cdot 4^2$



- $32 \div 2^3 + 6$

Grouping Symbols

- Parentheses:
 - Brackets:
 - Fraction Bar:
-
- Note:
 - Always start with the _____ grouping symbol and work your way out.
 - Always follow the _____ inside each individual grouping symbol.
 - For a fraction bar, do what is _____ and _____ it before you divide.

EX: Evaluate each expression.

- $4(3 + 9)$

- $3(8 - 2^2)$

- $2[(9 + 3) \div 4]$

EX: Evaluate each expression
when $y = 8$.

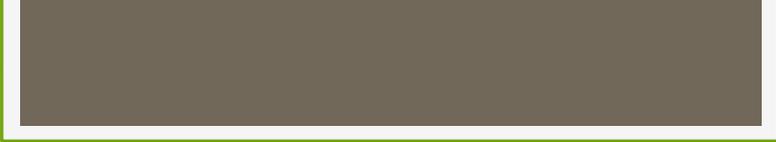
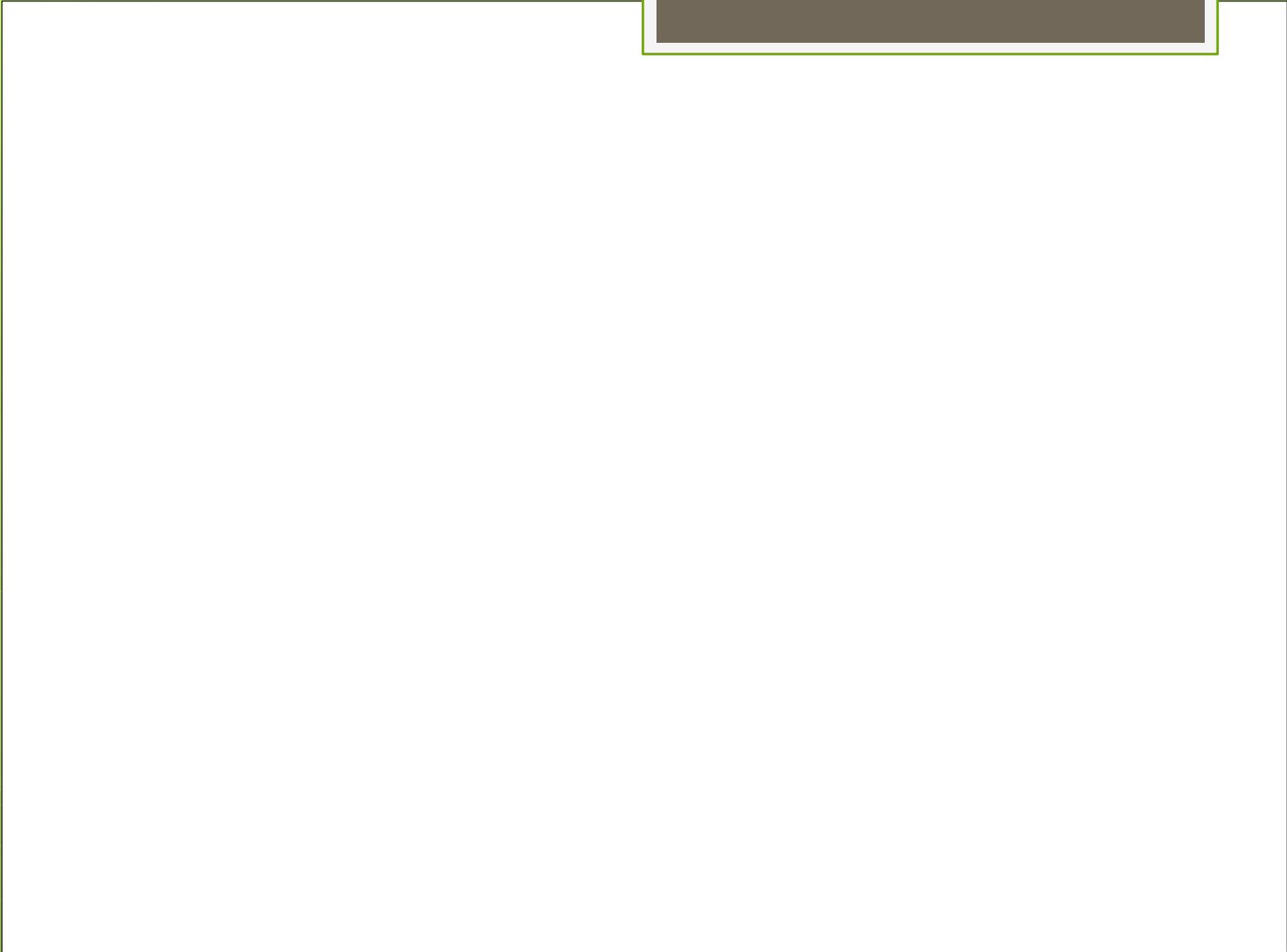
- $y^2 - 3$

- $\frac{10(y + 1)}{y - 3}$

EX:

- You join an online music service. The total cost (in dollars) of downloading 3 singles at \$.99 each and 2 albums at \$9.95 each is given by the expression $3(0.99) + 2(9.95)$.
- Find the total cost.

- You have \$25 to spend. How much will you have left?



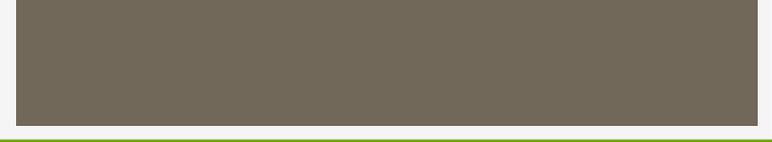


Sec 1.3
Write
Expressions

To translate verbal phrases into mathematical expressions, look for **KEY WORDS**.

- _____ **Key Words**

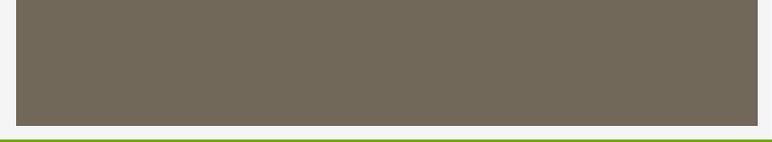
- EX: The sum of 8 and a number x



- _____ **Key Words**

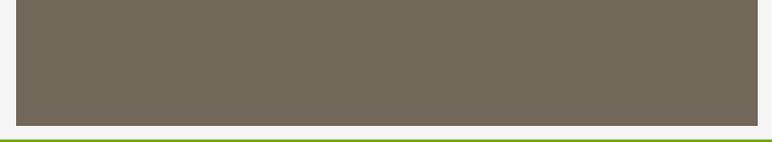
- EX: 7 less than a number y

- NOTE: Order matters!



- _____ **Key Words**

- EX: $\frac{1}{2}$ of a number z



- _____ **Key Words**

- EX: The quotient of 6 and a number a .

- NOTE: Order matters!

- NOTE: Anytime you multiply or divide a _____ by something, you must put the sum or difference in _____.
- EX: 3 times the sum of 7 and a number y

EX: Write an expression for the situation.

- A piece of rope L feet long is cut from a rope 10 feet long. Write an expression for the length of the remaining piece.

- Each person's share if p people are to divide \$90 evenly.

EX: Translate the verbal phrase into an expression.

- Three more than half of a number x
- Product of four and a number y
- 4 less than 6 times a number n

- The difference of 22 and the square of a number m
- The quotient when the quantity 10 plus a number x is divided by 2

○ **Rate** – a _____ that compares two quantities measured in _____.

○ EX:

○ **Unit Rate** – when the _____ of the _____.

○ EX:

○ Note:

○ _____ to turn a rate into a unit rate.

○ When comparing unit rates, make sure your units are the _____.

EX: Tell which rate is greater.

- \$3.50 for 25 ounces, or \$4.75 for 40 ounces

EX: Find the unit rate in feet per second.

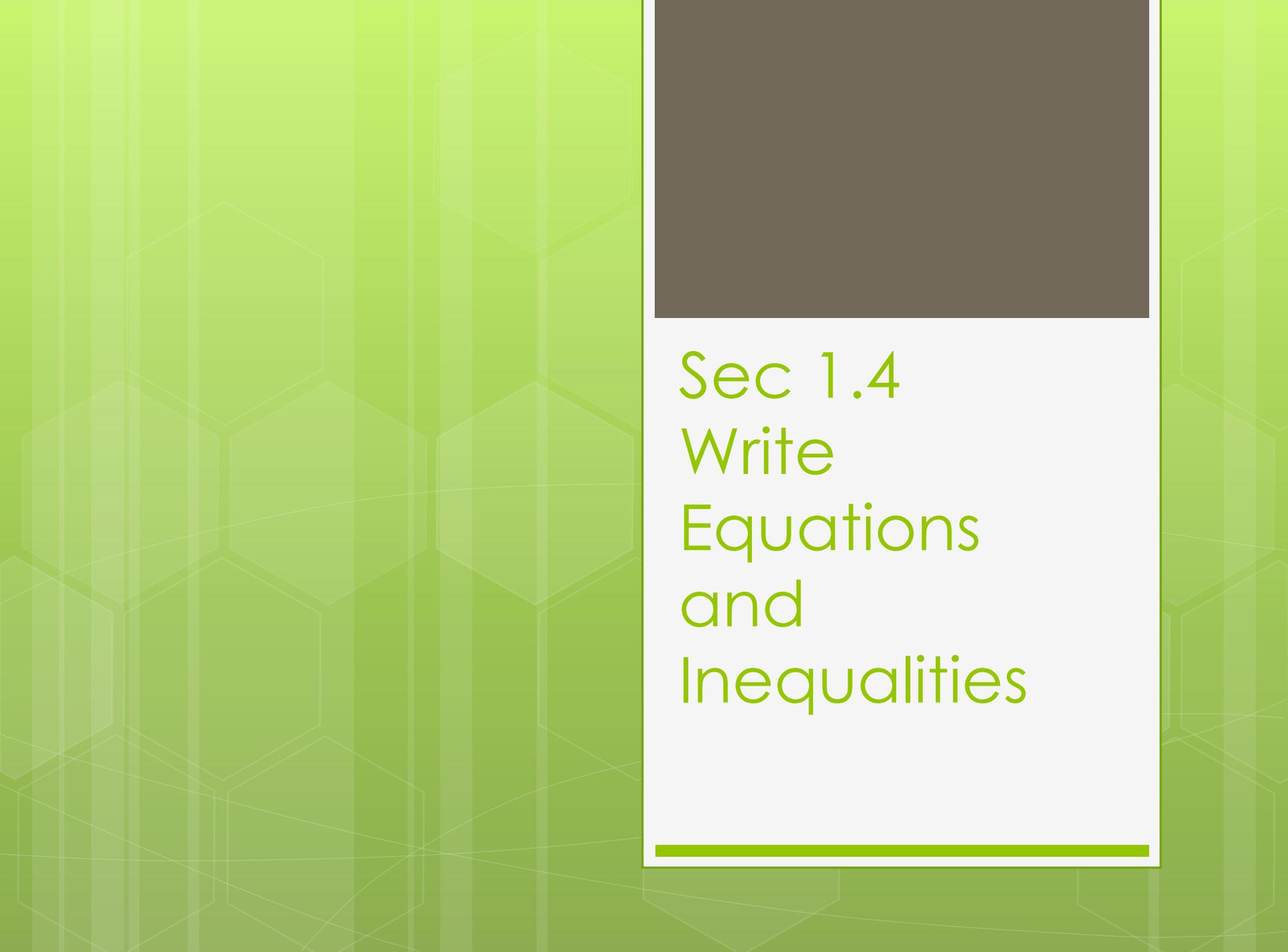
- Note: Multiply by a _____ to convert the units.
- A car travels 150 miles in 3 hours.

- 600 yards/1 minute

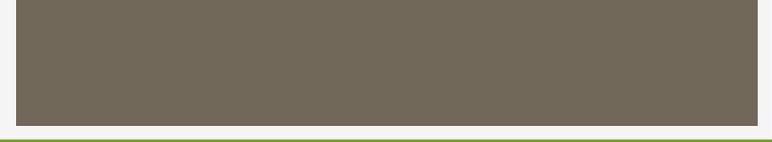
EX:

- You are ordering Detroit Lions tickets online. Each ticket costs \$55 and there is a \$6 charge no matter how many tickets are ordered. Write an expression for the cost (in dollars) of ordering the tickets. Then find the total cost if you order 8 tickets.





Sec 1.4
Write
Equations
and
Inequalities

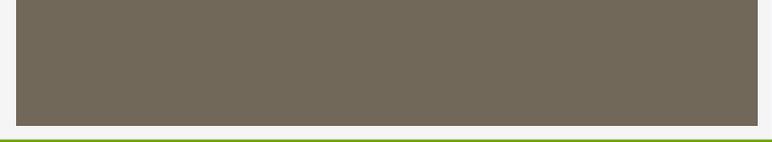


- **Equation** – a mathematical sentence with an _____

- EX:

- **Inequality** – a _____ of two expressions

- EX:



Symbols:

Combining Inequalities

- Two _____ inequalities can be _____ to form one _____.
- EX: $x > 8$ and $x < 15$ is the same as:

Read “ x is greater than 8 and less than 15”

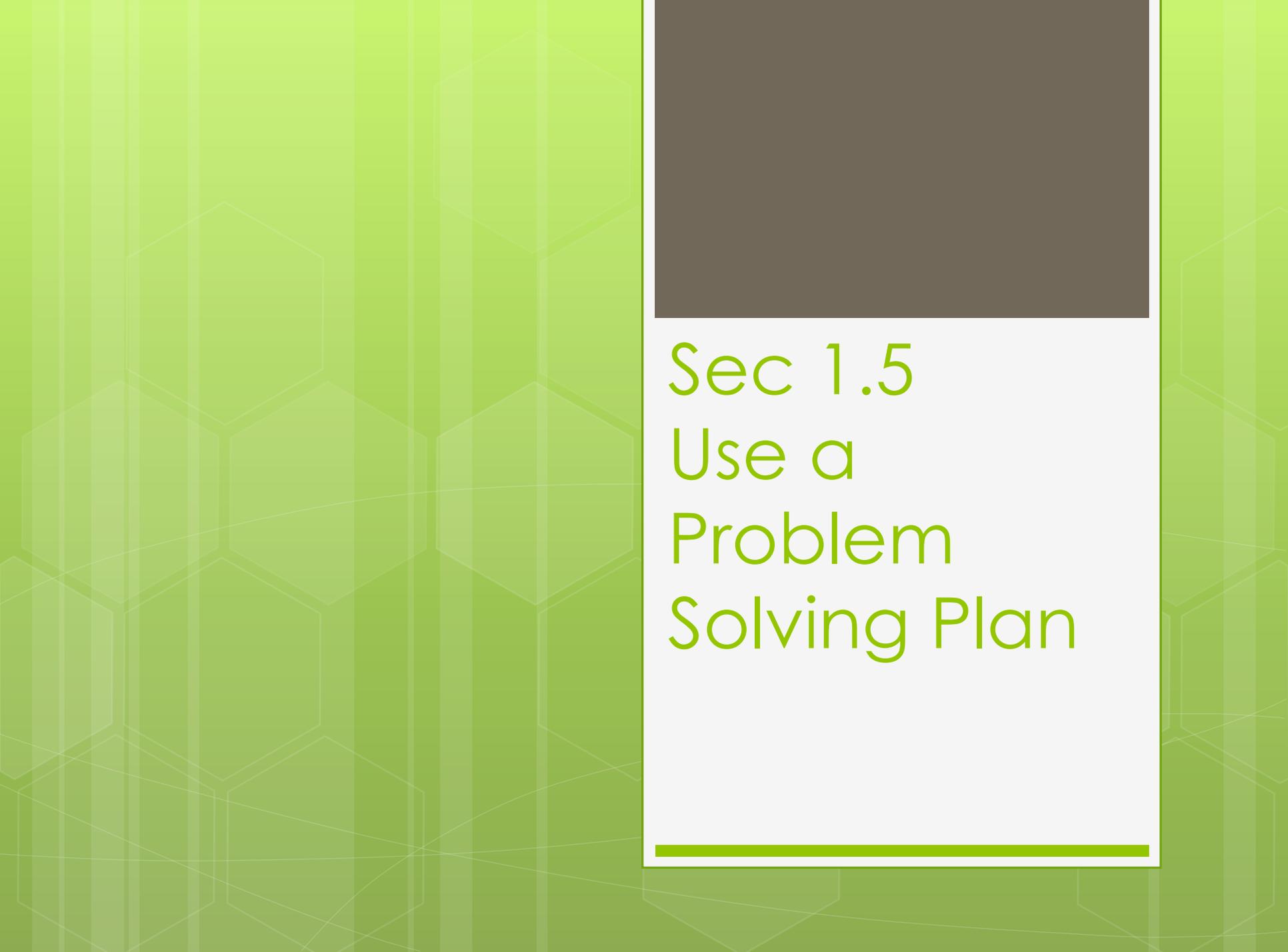
EX: Write an equation or inequality.

- The difference of twice a number k and 8 is 12.
- The product of 6 and a number n is at most 24.

- The sum of y and 1 is no less than 5 and no more than 13.
- The quotient of a number p and 12 is at least 30.

EX: Write an equation or inequality and solve.

- Your student senate budget is \$300. You want to buy the members t-shirts for \$6 each. Write an inequality that represents the number of shirts you can buy without going over budget.



Sec 1.5
Use a
Problem
Solving Plan

A Problem Solving Plan

- **Step 1: Pick out _____ and decide what you are trying to solve for.**
- **Step 2: Make a _____ to Solve.**
 - EX:
- **Step 3: _____ the Problem.**
 - EX:
- **Step 4: Check.**
 - See if your answer is reasonable.

Formula – a _____

- Formulas that should be memorized:

- **Temperature:**

- $C =$ _____

- $F =$ _____

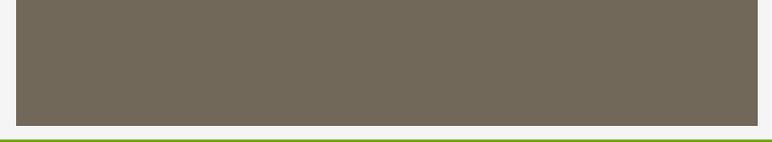
- **Simple Interest:**

- $I =$ _____

- $P =$ _____

- $r =$ _____

- $t =$ _____



o **Distance Traveled:**

o $d =$ _____

o $r =$ _____

o $t =$ _____

o **Profit:**

o $P =$ _____

o $I =$ _____

o $E =$ _____

○ **Area of a Rectangle:**

○ $l =$ _____

○ $w =$ _____

○ **Area of a Triangle:**

○ $b =$ _____

○ $h =$ _____

○ **Perimeter:**

EX: Solve

- One day this summer the temperature in Ontario, Canada was 30 degree Celsius. The temperature in Monroe, MI was 95 degrees Fahrenheit. Which temperature was higher?

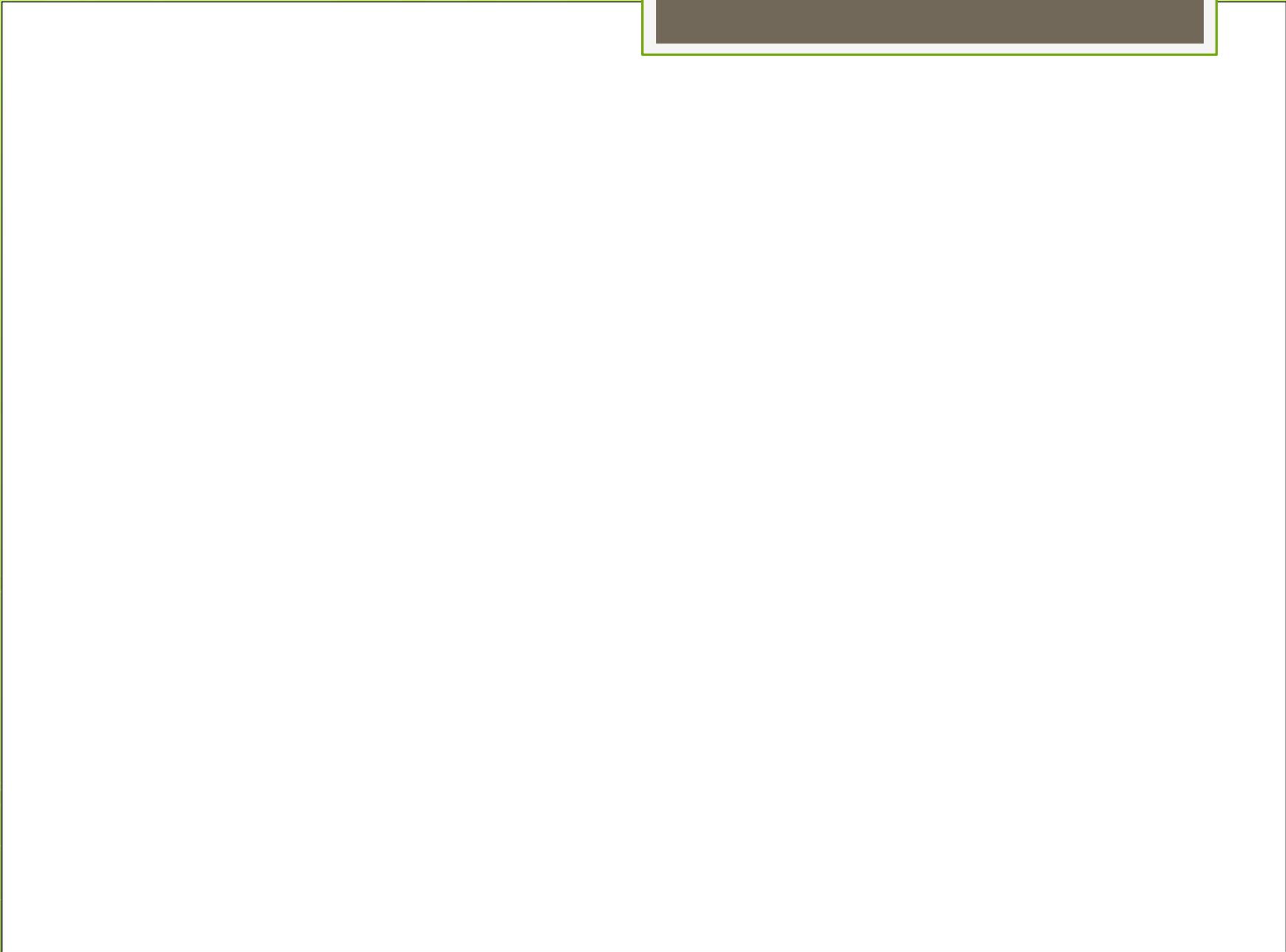
- What is the interest on \$1500 invested for 3 years in an account that earns simple interest at a rate of 5% per year?

- A bike travels at a rate of 20 mph. How far will it travel in 6 hours?

EX:

- A gardener determines the cost of planting daffodil bulbs to be \$2.40 per square foot. How much will it cost to plant daffodil bulbs in a rectangular garden that is 12 feet long and 5 feet wide?





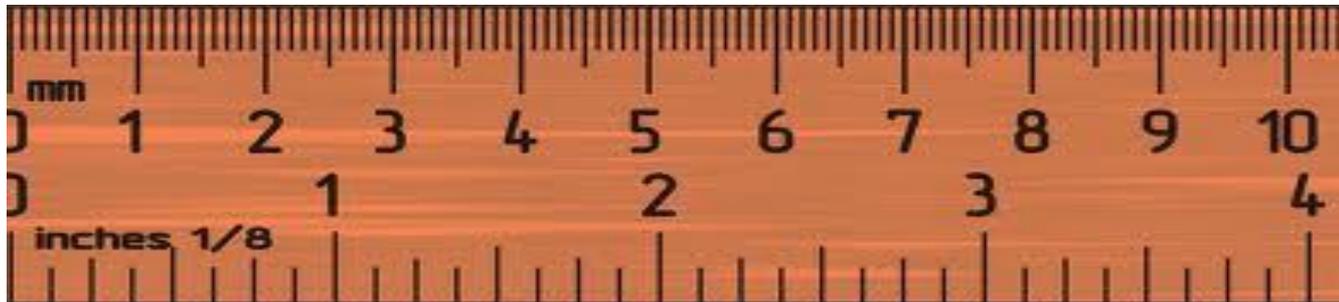


Sec 1.6
Use Precision
and
Measurement

Precision -

- How _____ a measurement is.
- Precise measurements in general have:
 - More _____
 - Have _____ units
- EX: A watch that measures in seconds is more precise than a watch that measures in minutes, because a second is smaller than a minute.

- EX: Which side of the ruler would give a more precise measurement?



EX: Choose the more precise measurement.

○ 21.13 oz ; 21.4 oz

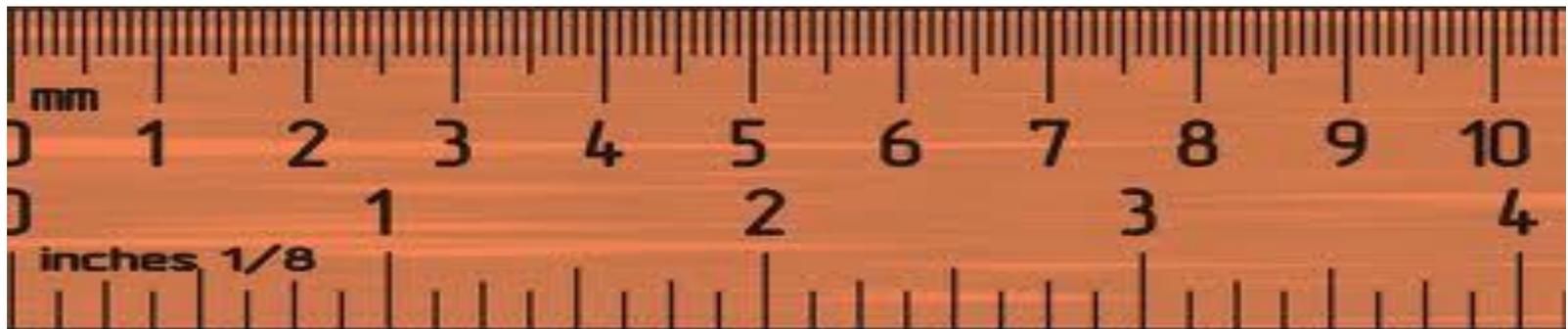
○ $14 \frac{1}{2}$ in. ; $2 \frac{5}{8}$ in.

○ 14 mm ; 2 cm

○ 2.5 hr ; 90 min

Significant Digits -

- The digits in a _____ that carry meaning.
 - All the digits you _____ when taking a measurement plus the _____.
 - EX:

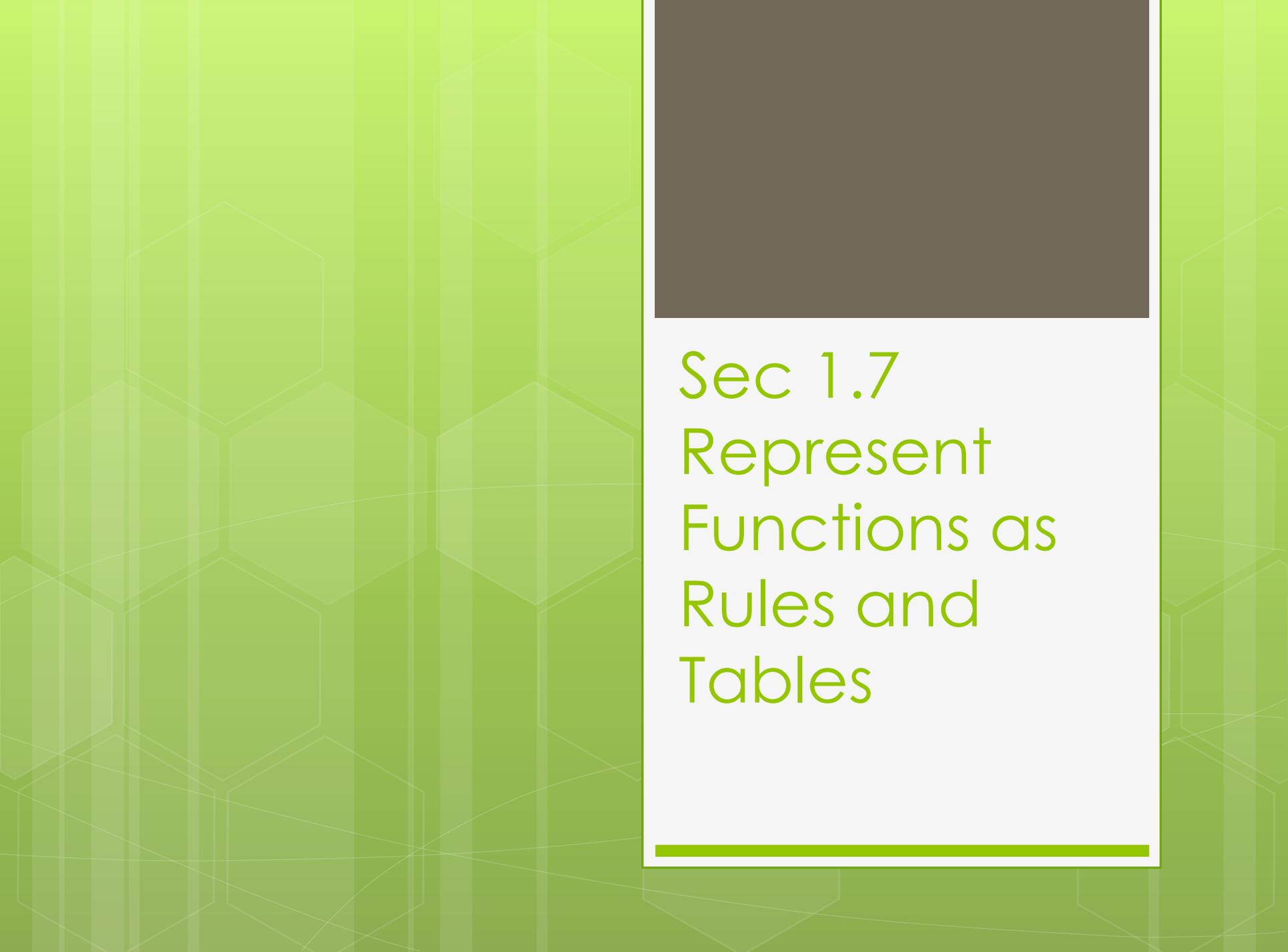


Rules for Determining Sig. Digits

- 1) All _____ are significant.
 - EX: **114.67** has 5 sig dig
- 2) Zeros that are to the _____ of both the last nonzero digit and the decimal point are significant.
 - EX: 0.0000**500** has 3 sig dig
- 3) _____ between sig digits are significant.
 - EX: **7000.8** has 5 sig dig
- 4) Zeros at the _____ of whole numbers are usually assumed to be nonsignificant.
 - EX: **300** has 1 sig dig

EX: Determine the number of sig dig in each measurement.

- 800.20 ft
- 0.0005 cm
- 36,500 yd
- 67.00 m
- 60 sec



Sec 1.7
Represent
Functions as
Rules and
Tables

Function -

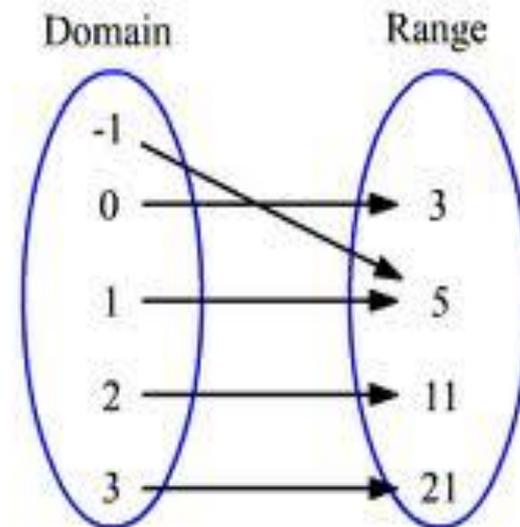
- A set of _____ (called the _____) and _____ (called the _____) such that each input is paired with _____ output.
- EX: Pumping Gas – the total cost depends on the number of gallons you pumped.
 - So the total cost is a **function** of the number of gallons.

EX: Birthday Function

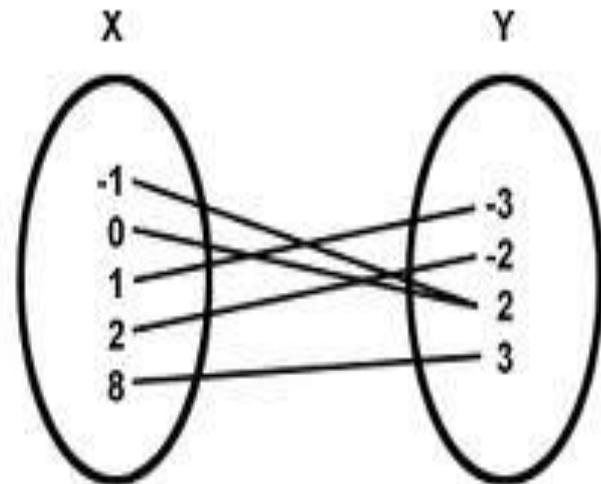
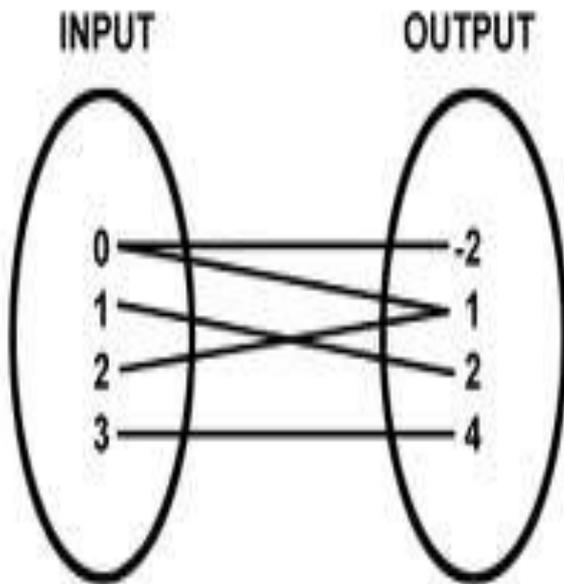
- People – Domain
- Birthdays – Range
- Each person can only have _____ birthday.
- But, more than one person can have the _____.

- Functions can be represented as tables.
- EX:

Input (days)	Output (\$)
1	15
2	20
4	30
6	40
9	55
11	65



EX: Tell whether the pairing is a function.



EX: Tell whether the pairing is a function.

Input						
Output						

Input	Output

- A function may also be represented by an _____.
- _____ Variable (x) – input values
- _____ Variable (y) – output values
- The value of the dependent variable **depends** on the value of the independent variable.

EX:

- Rule: The output is 6 less than the input.
- Equation:
- Table:

Input, x	10	9	8	7	6
Output, y					

EX:

- Make a table for the function $y = \frac{1}{2}x + 4$ with domain 0, 5, and 10. Then identify the range of the function.

EX:

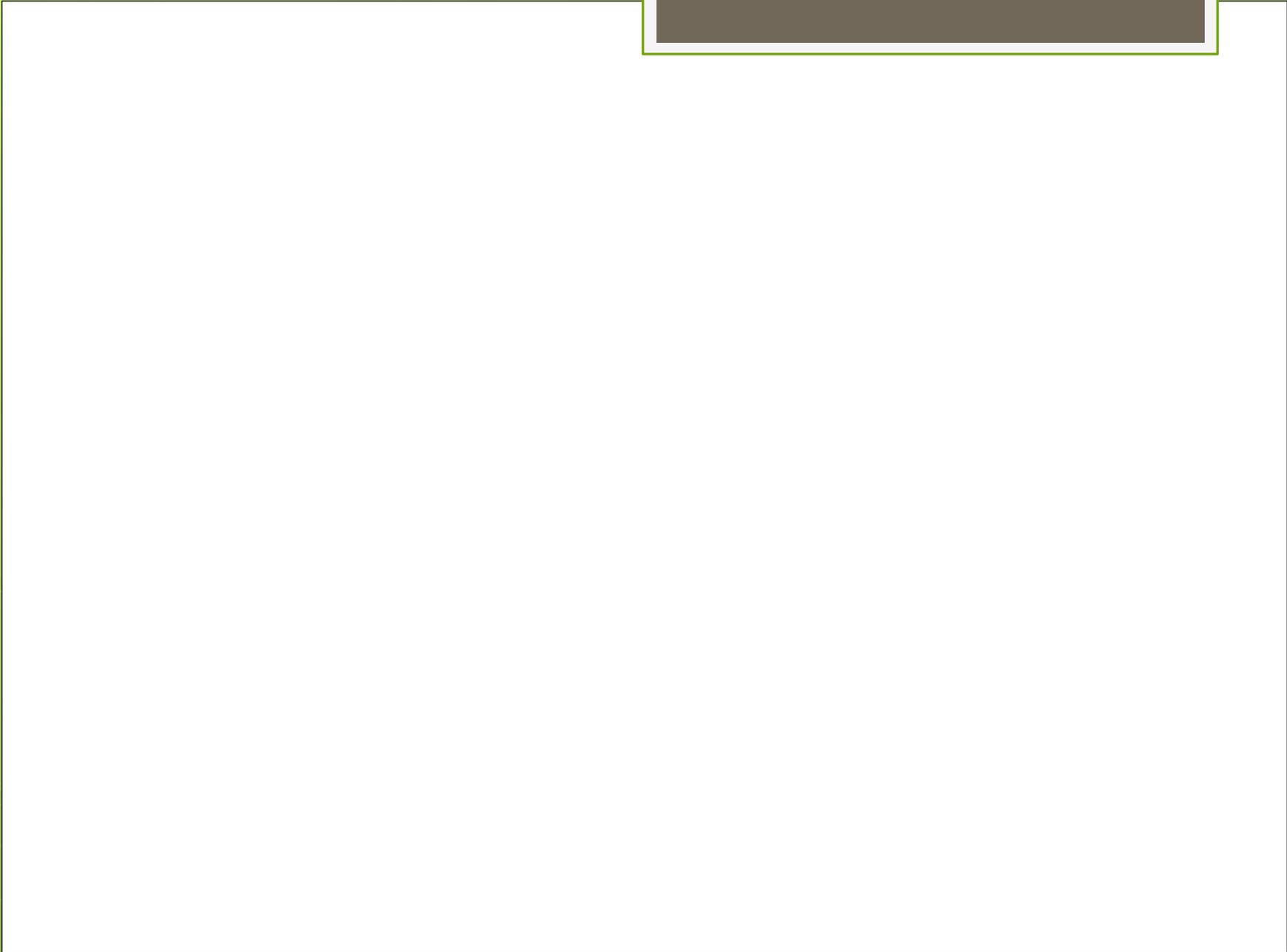
- Write a rule for the function. Then identify the domain and range.

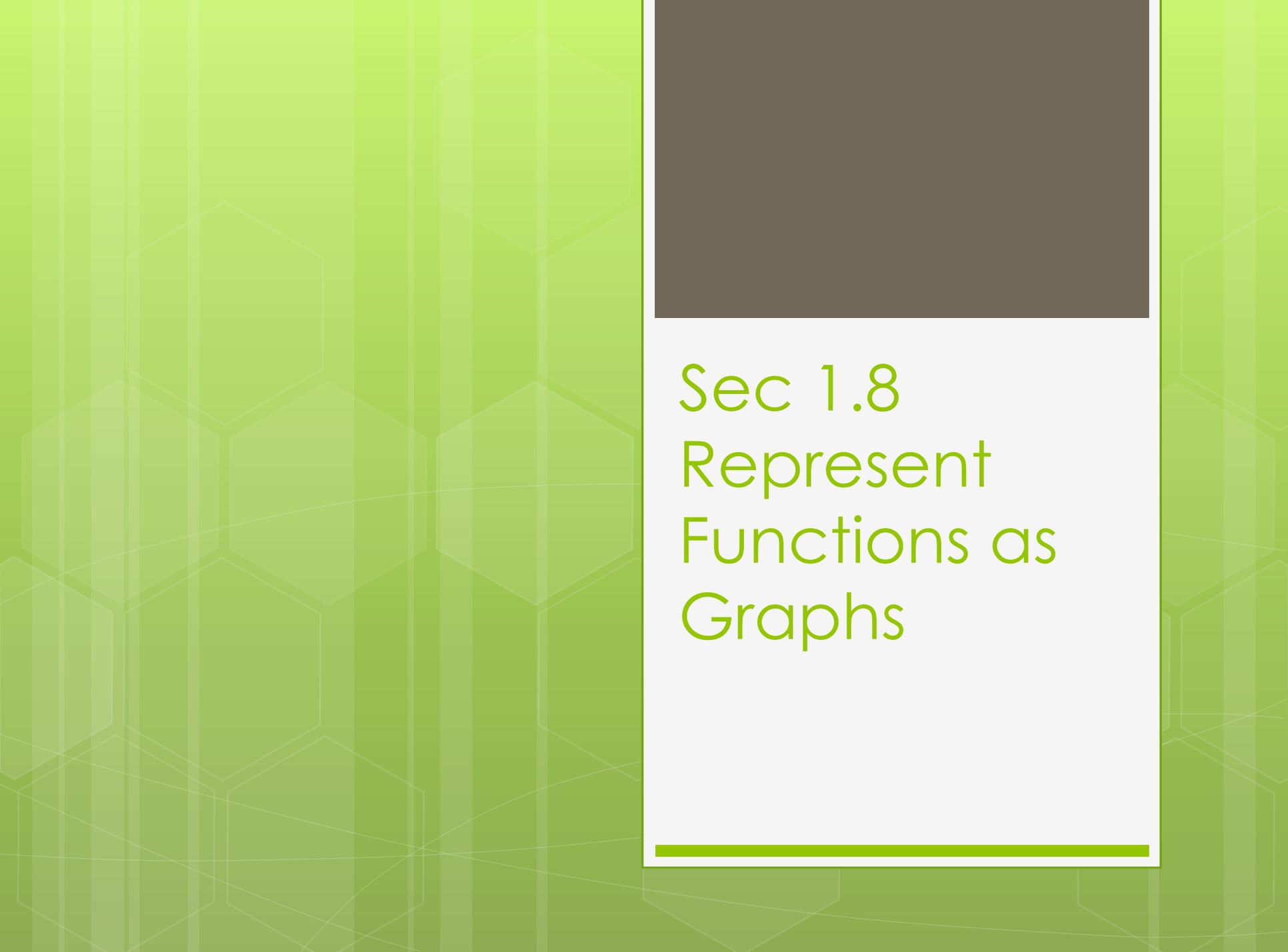
Time (hours)	1	2	3	4
Pay (dollars)	8	16	24	32

EX:

- You are buying concert tickets that cost \$15 each. You can buy up to 6 tickets. Write the amount (in dollars) you spend as a function of the number of tickets you buy. Identify the independent and dependent variables. Then identify the domain and range of the function.







Sec 1.8
Represent
Functions as
Graphs

Functions

- Functions can also be represented as _____, by putting the values from a table into _____.

Table

Input, x	Output, y
1	2
2	3
4	5

Ordered Pairs

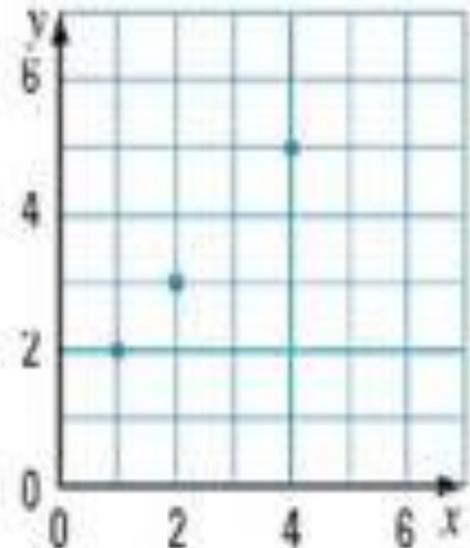
(input, output)

(1, 2)

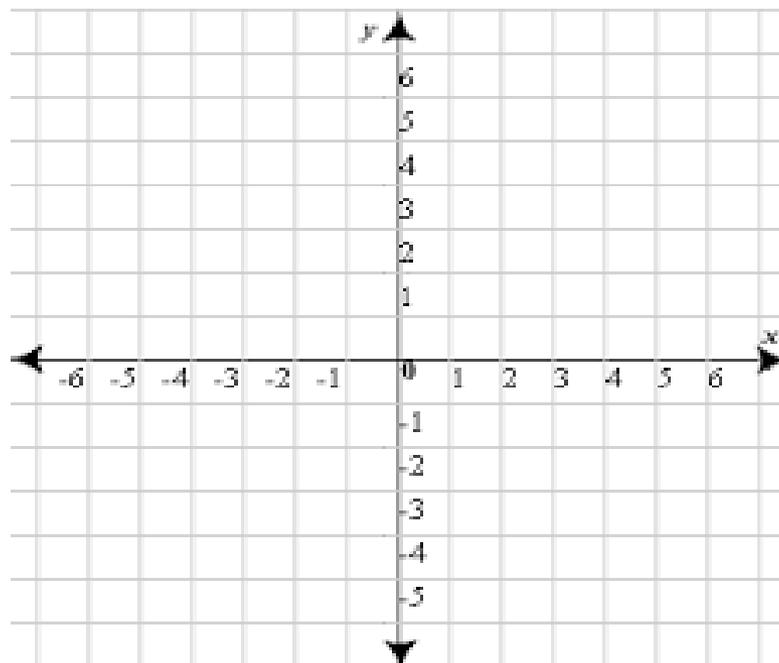
(2, 3)

(4, 5)

Graph

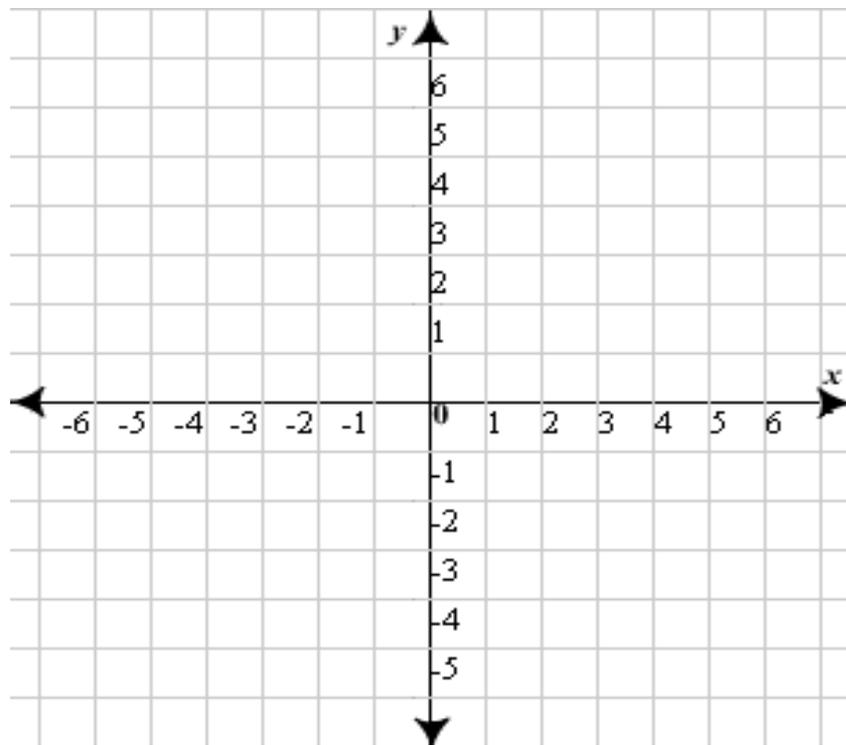


○ NOTE: (x, y)



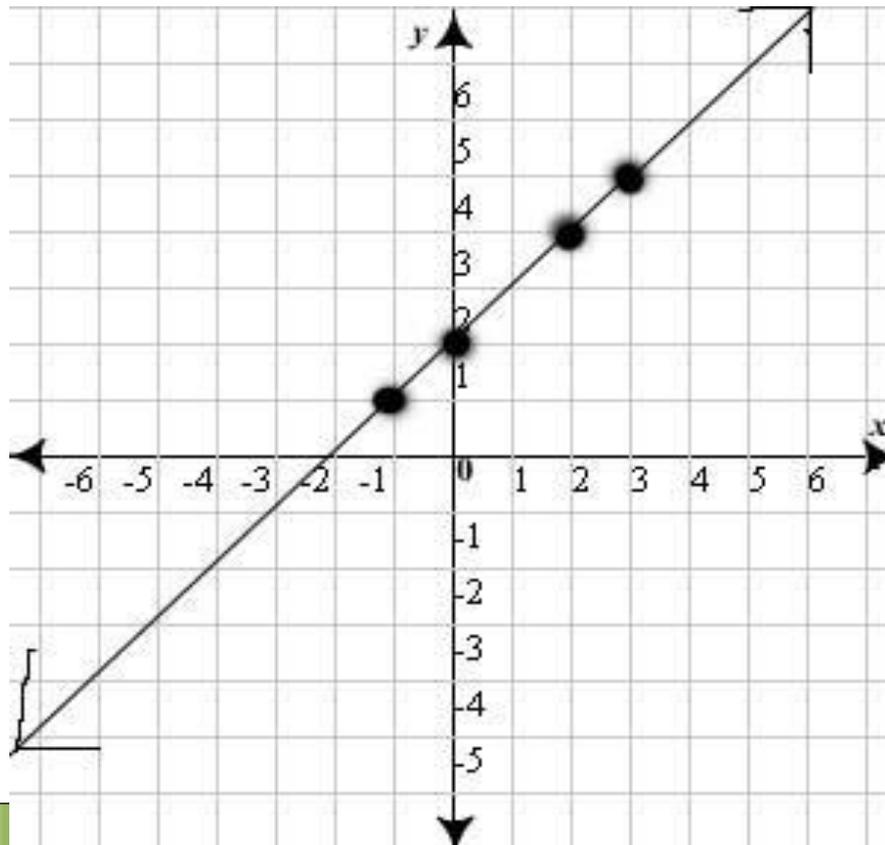
EX:

- Graph the function $y = 2x - 1$ with the domain 1, 2, 3, 4, and 5 by making a table and then plotting the ordered pairs.



EX:

- Write a rule for the function represented by the graph. Identify the domain and the range of the function.



EX:

- Graph the function that represent the enrollment at SMCC since 2004. ($t = 0$ corresponds to 2004)
- Describe what happened to the enrollment as time went on.

Years since 2004, t	0	1	2	3	4	5	6	7	8
Enrollment, e	398	405	400	410	413	420	427	445	451

Name : _____

Date : _____

