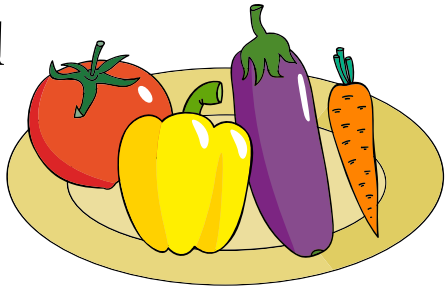
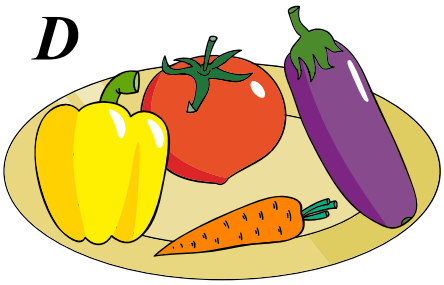
Lesson 4

1 Are the vegetables on plates ***A*** and ***B*** the same?

A



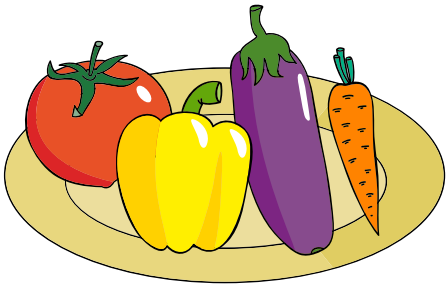
D



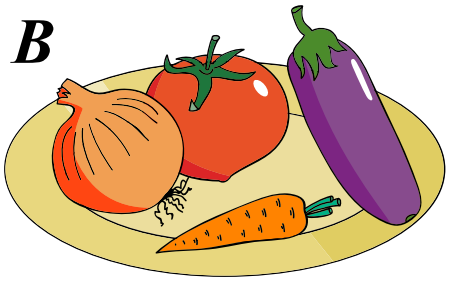
A = ***D*** = {_____, _____, _____, _____}

Two sets are called **equal** if <u>all</u> their elements are the same.

A



B



Two sets are **not equal** if there is an element that belongs to one set but not to the other.

To write if two sets are equal or not, we use the signs "=" and "≠".

A = {_____, _____, _____, _____}

B = {_____, _____, _____, _____}

$$A \neq B$$

Which element belongs to set ***A*** but not to set ***B***? _____

Which element belongs to set ***B*** but not to set ***A***? _____

2

Check if the sets below are compared correctly:

a) {♫, ☺, ◊, ☼, ♥} = {♫, ◊, ☺, ♥, ☼}

b) {♫, ◊, ☼, ▲, ♪} = {♫, ♪, ☺, ♥, ▲}

c) {♯, ◘, ●, ○, ☼} = {♯, ◘, ●, ♪, ☼}

3

Let set ***A*** = {0, 1, 2}

State and explain which of the sets are equal to ***A***:

B = {2, 0, 1} ***C*** = {1, 0} ***D*** = {3, 2, 1, 0}

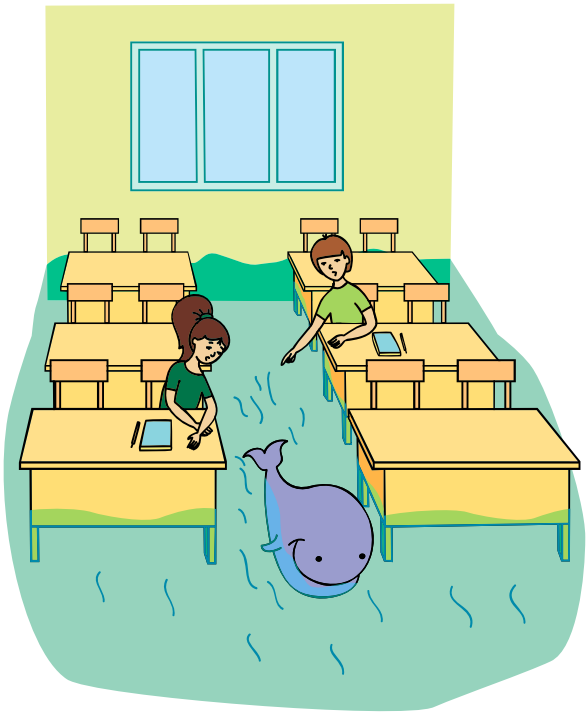
A set without elements is called an **empty** set.

The symbol for an empty set is ∅.

4

Do you see any whales swimming inside your classroom? _____

The set of whales swimming in your classroom is an empty set!



What do we call a set of six-legged horses?

_____

What do we call a set of crocodiles living on the North Pole?

_____

What do we call a set of 3 year olds in the third grade?

_____

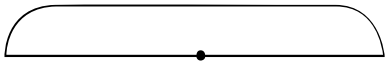
What other example of an empty set do you know?

_____

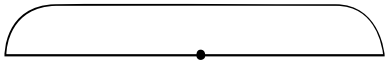
5

For each of the problems below, select the appropriate diagram to use and write the expressions.

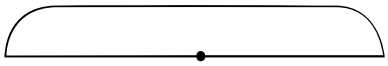
a) Nick saved ***x*** dollars for his sister's birthday. His brother Tom saved ***y*** dollars for the same occasion. How much money did the boys save together?



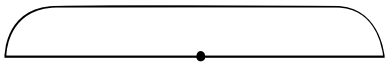
b) There are 5 eggs in each of ***n*** baskets. How many eggs are there in total?



c) Each month Lisa saves ***w*** dollars towards buying a new bike. She needs to keep saving for ***q*** months to purchase the bike. How much does it cost?



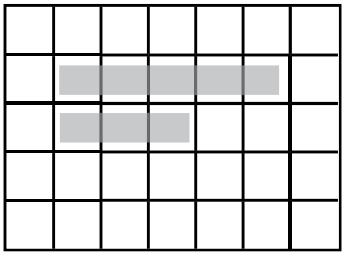
d) There are ***m*** books on each of ***q*** shelves. How many books are there on the shelves in total?



6

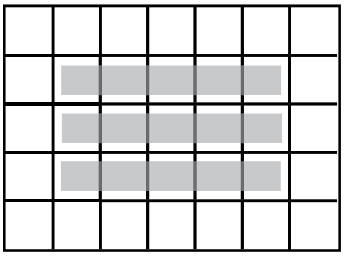
Fill in the tables:

	4	5	7	8
3 more				
3 times more				

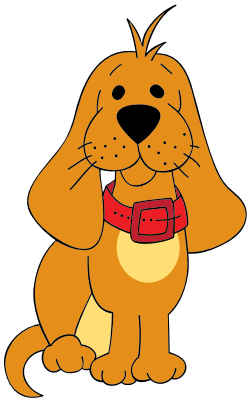


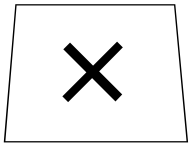
3 more

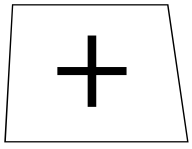
	4	5	7	8
5 more				
5 times more				



3 times more

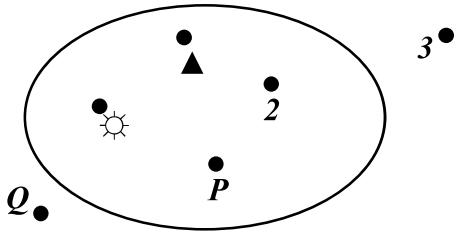






Venn Diagram

7 Take a look at the diagram of a set ***A***. List the elements that belong to the set ***A***. Which elements do not belong to the set ***A***?



A = { , , , }

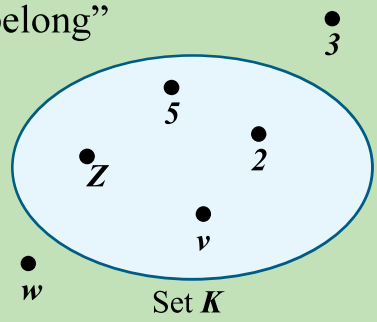
_____ do not belong to set ***A***.

Venn Diagrams are used to visualize sets:

any object within the oval belongs to the corresponding set;
any object outside the oval does not belong to the set.

The symbol ∈ means "belong"
The symbol ∉ means "does not belong"

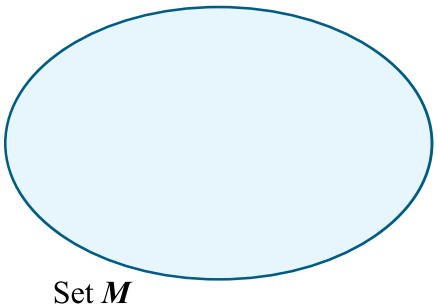
Examples:
v ∈ K
w ∉ K
2 ∈ K
3 ∉ K



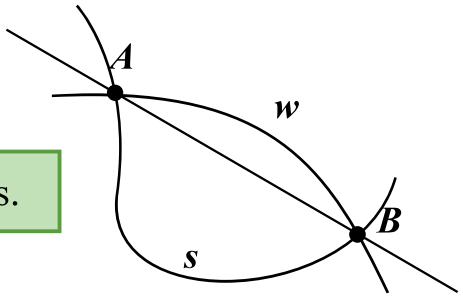
8 Set ***M*** = {a, ☼, ♥, 2, ♫}

Complete statements with the symbols ∈ or ∉, and place the elements in the Venn Diagram accordingly:

a ☐ M		♫ ☐ M	
9 ☐ M		♥ ☐ M	
☼ ☐ M		5 ☐ M	
☺ ☐ M		2 ☐ M	



9 If you had to walk from point ***A*** to point ***B*** which path would you choose?



What is the shortest path from point ***B*** to point ***A***?

A straight line is the shortest path between any two points.

How many different straight lines can one plot through two points? _____

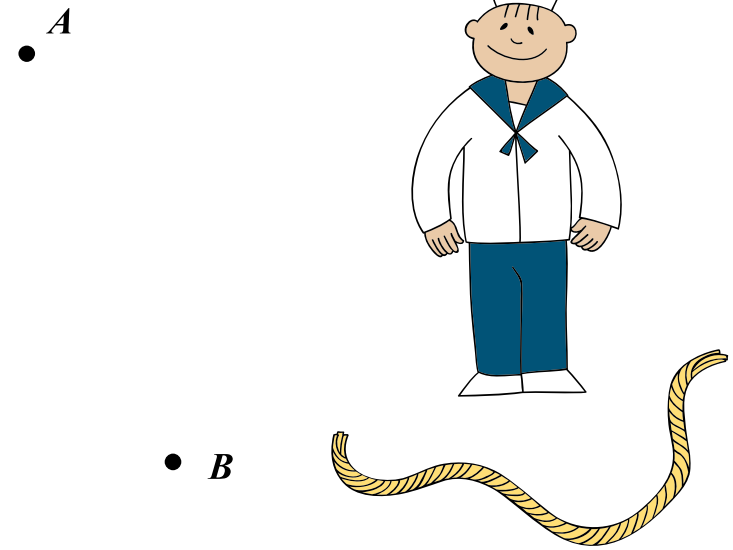
10 Draw two curved lines ***e*** and ***q*** between points ***A*** and ***B***.

Find a point that belongs to the line ***e***, but not to the line ***q***. Mark it ***N***.

How many different curved lines can one draw between points ***A*** and ***B***?

_____

Draw the shortest path between points ***A*** and ***B***.



11 Which of the statements about the diagram you drew are incorrect? Cross them out:

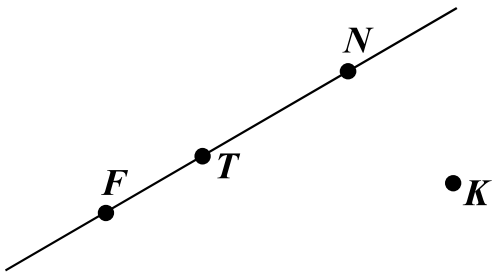
$A \in e$ $N \in e$ $N \notin e$ $A \in AB$ $A \notin q$ $e = q$ $q \neq e$

12 Look at the diagram and evaluate the statements as TRUE or FALSE. Cross out the false statements.

$F \in TN$ $N \in TF$

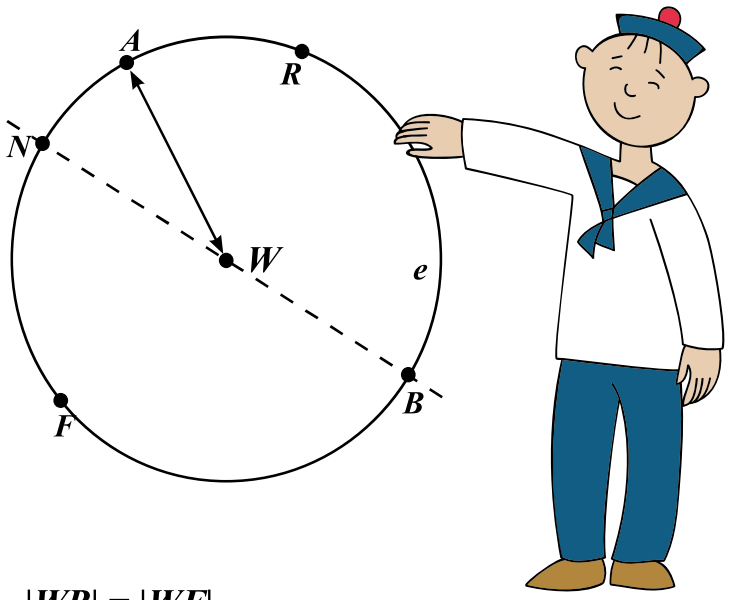
$TN = FN$ $NF \neq TF$

$K \in TN$ $TK = TN$



13

Curve e is a circle. Measure its radius and evaluate the statements as TRUE or FALSE:



e = Circ(N, 3 cm)

e = Circ(W, 4 cm)

e = Circ(W, 3 cm)

$F \in e$ $\quad$ $W \in e$

$|WA| = 3$ cm $\quad$ $|WR| = 4$ cm

$|NB| = 3$ cm $\quad$ $|NB| = 6$ cm

$R \in e$ $\quad$ $|AR| > |NB|$ $\quad$ $|WR| = |WF|$

14

Use rectangles to visualize and solve the following equations:

6 30 x			
$x \times 6 = 30$	$42 \div y = 7$	$9 \times z = 72$	$t \div 6 = 8$
$x =$	$y =$	$z =$	$t =$
$x =$	$y =$	$z =$	$t =$

15

Do you remember Little Joe and Foxy Tail? Foxy Tail always lies and Little Joe always tells the truth.

FT: **My brother LJ likes milk.**

LJ: **My brother FT likes milk**

Which of the two brothers likes milk?

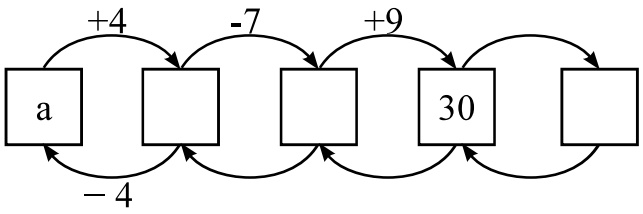
Equations with Multiple Operations

16 Analyze the listed in equations and undo the operations to find the unknowns.

$a + 4 - 7 + 9 = 30$

$a = 30 - 9 + 7 - 4$

$a =$

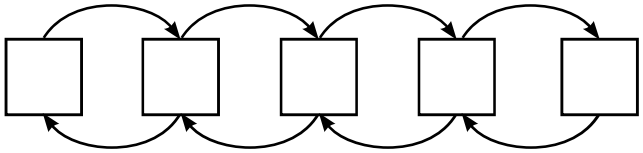


Operations are undone in reverse order.

$w - 7 - 12 = 9$

$w =$

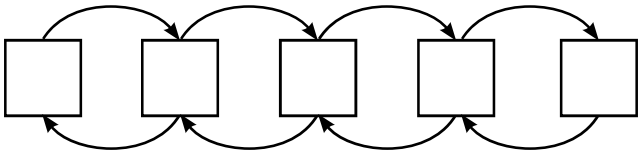
$w =$



$x - 8 + 11 - 4 = 9$

$x =$

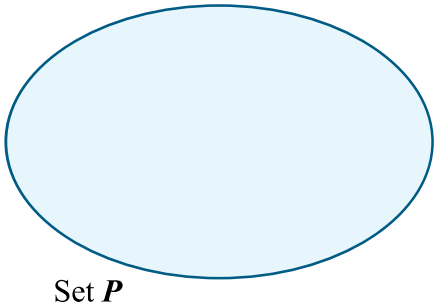
$x =$



17 Set $P = \{a, 2, 5, q, d, 4\}$

Place the following objects into the Venn Diagram:

a, b, c, d, e, 1, 2, 3, 4, 5.



Set ***P***