

ction 1.2

D

Variables: -

\* when A letter represent a number.

Algebraic expressions: -

\* Is an expression formed by numbers and variables connected by operations.

$$\sqrt{m} + 2n = 7.$$

Example: -

The area of a rectangle with length  $l$  and width  $w$  is  $lw$ . Find the area of a rectangle with length 5m and width 3.2m.

$$\begin{aligned} \text{Area} &= l \cdot w \\ &= 5 * 3.2 \\ &= 16 \text{ m}^2 \end{aligned}$$

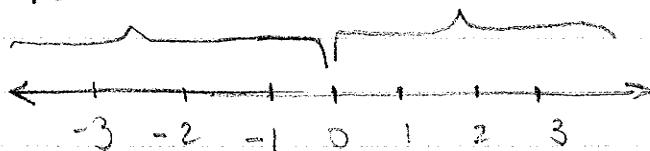
Example

Evaluate  $b - 5a$  when  $a = 4$  and  $b = 35$

$$\begin{aligned} b - 5a &= ? , \quad a = 4 , \quad b = 35 \\ 35 - 5 \cdot 4 &= 15. \end{aligned}$$

number line: -

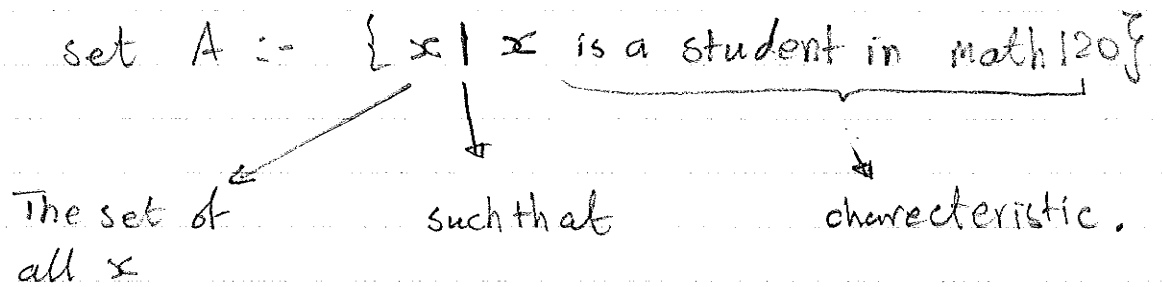
negative number. Positive numbers



\* Sets :-

A set is a group of elements.

\* set builder notation :-



\* A set that contains no elements is called the empty set (null set)

\* symbol of empty set :-  $\{\}$ ,  $\emptyset$ .

\* Roster form :-

listing all the elements of the set.

\* number sets

Natural numbers :-  $\{1, 2, 3, \dots\}$

whole numbers :-  $\{0, 1, 2, 3, \dots\}$

Integers :-  $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

Example

write each set in roster notation. —

$$\textcircled{1} \{x \mid x \text{ is a whole number between 0 and 4}\}$$

$$\{1, 2, 3\}$$

$$\textcircled{2} \{x \mid x \text{ is a natural number greater than 80}\}$$

$$\{81, 82, 83, \dots\}$$

The symbol  $\in$  is used to denote that an element is in a particular set.

The symbol  $\in$  is read "is an element of"  
 The symbol  $\notin$  is read "is not an element of"

$$\rightarrow \begin{array}{l} -1 \notin \{1, 2, 3\} \\ 3 \in \{1, 2, 3\} \end{array}$$

Example

Determine whether the following statements is true or false.

a)  $0 \in \{x \mid x \text{ is a natural number}\}$   
false

b)  $9 \notin \{4, 6, 8, 10\}$  / True

(4)

Identifying numbers :-

Real numbers :-

$\{ x \mid x \text{ corresponds to a point on the number line} \}$

Rational numbers :-

$\{ \frac{a}{b} \mid a \text{ and } b \text{ are integers and } b \neq 0 \}$

Irrational numbers :-

$\{ x \mid x \text{ is a real number and } x \text{ is not a rational number} \}$

EX :-

$\frac{14}{6}$  is a rational number.

$0.5 = \frac{1}{2}$  is a rational number

$0.090909... = \frac{1}{11}$  is a rational number

$\sqrt{5}$  is an irrational number.

$\frac{2}{\sqrt{3}}$  " " " "

(b)

The symbol  $\subset$  means a subset.

⊙ Example

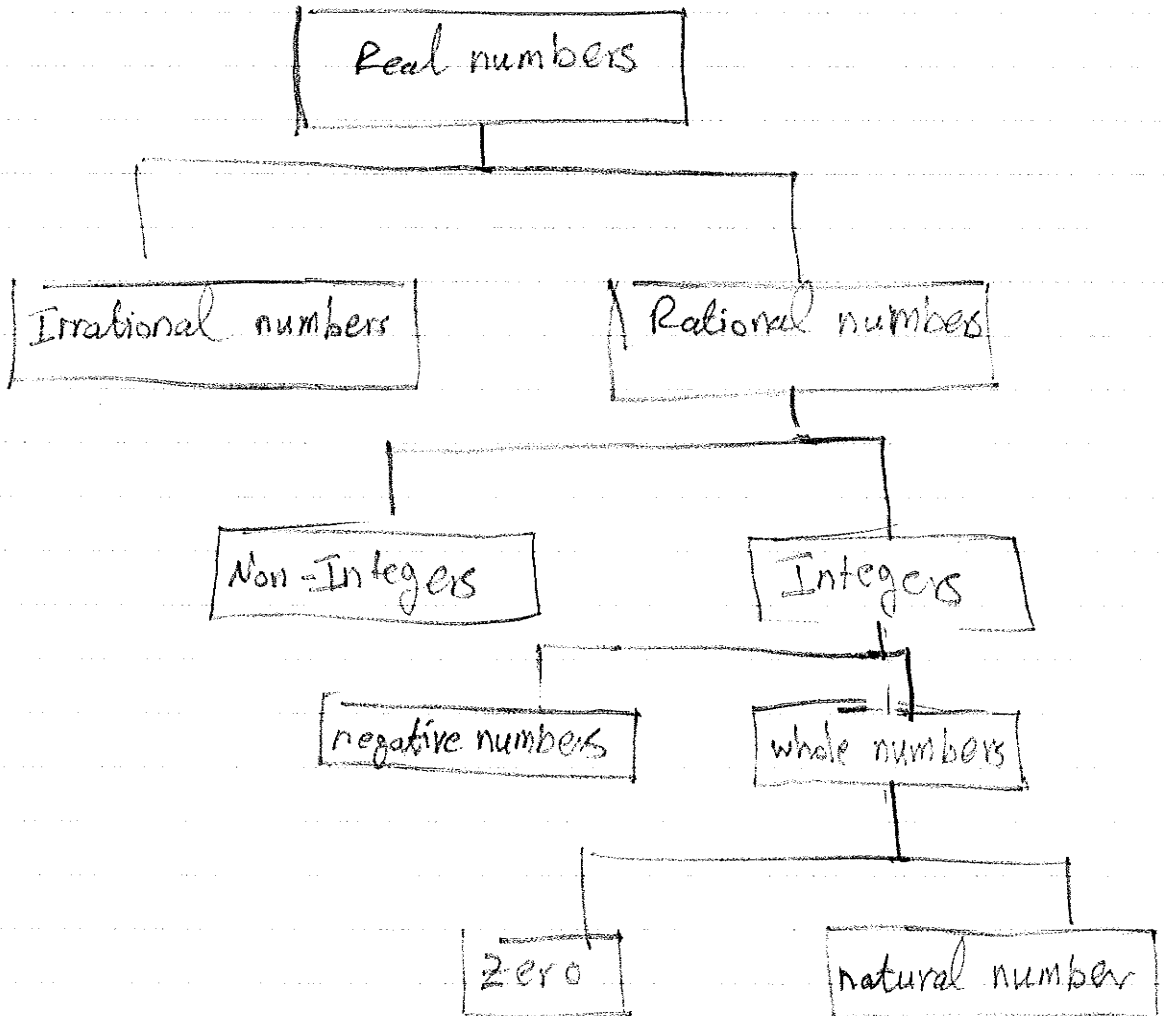
$$\mathbb{Z} = \{1, 2, 3, 4, \dots\}$$

$$\mathbb{Q} = \{x \mid x \text{ is a multiple of } 2\}$$

$$\mathbb{P} = \{x \mid x \text{ is a multiple of } 0.5\}$$

$$\mathbb{Q} \subset \mathbb{Z}$$

$$\mathbb{P} \not\subset \mathbb{Z}$$



(6)

Example

Determine whether each statement is true or false:-

- a) 0 is a real number / True
- b) Every integer is a rational number / True
- c)  $\sqrt{3}$  is a rational number. / False
- d)  $d \subseteq \{1, 3, 5, 7, 9\}$  / True

Absolute value:-

The absolute value

$$|a| = \begin{cases} a & \text{if } a \text{ is } 0 \text{ or a positive number.} \\ -a & \text{if } a \text{ is a negative number.} \end{cases}$$

opposite:-

The opposite of a number  $a$  is  $-a$ .

EX

write each phrase as an algebraic expression:-

- |                                                    |                    |
|----------------------------------------------------|--------------------|
| a) Twice a number                                  | $2x$               |
| b) Five more than six times a number               | $5 + 6x$           |
| c) The quotient of six and a number                | $\frac{6}{x}$      |
| d) one fourth subtracted from three times a number | $3x - \frac{1}{4}$ |

Three times the difference of  
a number and ten

$$3(x - 10)$$

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HW: 5, 15, 19, 31, 33, 35, 37, 39  
43, 45, 47, 49, 51, 59, 61, 65  
89, 91