



## CLASS NOTES

### Properties of Division of Integers

#### ➤ Closure property

Integers are not closed under division.

**For any two integers  $a$  and  $b$ ,  
 $a \div b$  is not always an integer**

Example: Let  $a = 8$  and  $b = 2$  then  $8 \div 2 = 4$ ; an integer

Let  $a = 2$  and  $b = 8$  then  $2 \div 8 = \frac{1}{4}$ ; not an integer

#### ➤ Commutative property

Division is not commutative for integers.

**For any two integers  $a$  and  $b$ ,  
 $a \div b \neq b \div a$**

Example: Let  $a = 6$  and  $b = 3$

$$a \div b = 6 \div 3 = 2$$

$$b \div a = 3 \div 6 = \frac{1}{2}$$

$$\therefore a \div b \neq b \div a$$

#### ➤ Associative property

Division is not associative for integers.

**For any three integers  $a$ ,  $b$  and  $c$ ,  
 $(a \div b) \div c \neq a \div (b \div c)$ ; if  $c \neq 1$**



Example:

- Let  $a = 8$ ,  $b = 2$  and  $c = 1$

$$(a \div b) \div c = (8 \div 2) \div 1 = 4 \div 1 = 4$$

$$a \div (b \div c) = 8 \div (2 \div 1) = 8 \div 2 = 4$$

$$\therefore (a \div b) \div c = a \div (b \div c); \text{ if } c = 1$$

- Let  $a = 8$ ,  $b = 2$  and  $c = 4$

$$(a \div b) \div c = (8 \div 2) \div 4 = 4 \div 4 = 1$$

$$a \div (b \div c) = 8 \div (2 \div 4) = 8 \div \frac{1}{2} = 16$$

$$\therefore (a \div b) \div c \neq a \div (b \div c); \text{ if } c \neq 1$$

- An integer divided by zero is not defined.

**For any integer a,  
 $a \div 0 = \text{Not defined}$**

Example:  $5 \div 0 = \text{Not defined}$

- Zero divided an integer other than zero is equal to zero.

**For any integer a,  
 $0 \div a = 0$  for  $a \neq 0$**

Example:  $0 \div 8 = 0$

- Any integer divided by 1 gives the same integer.



**For any integer a,  
 $a \div 1 = a$**

Example:  $5 \div 1 = 5$

