

STUDY COURSE MATERIAL

MATHEMATICS

SESSION-2020-21

CLASS-VII

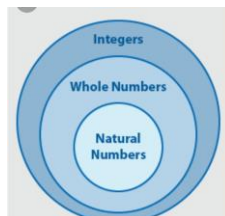
TOPIC: INTEGERS

DAY-1

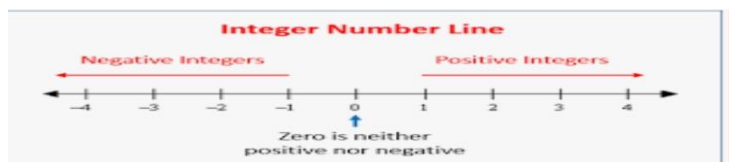
❖ TEACHING MATERIAL

Explanation of natural numbers and Whole number, and integers.

- ★ Counting numbers are called natural numbers. Thus 1,2,3...etc
- ★ All natural numbers together with 0 are called whole numbers.
- ★ All natural numbers 0 and negatives of counting numbers are called integers.



Representation of integers



Related questions

- ★ Represent the following integers on number line
a) -6 b) -8 c) 25
- ★ Write true or false for the following statements
a) The smallest integer is 0.
b) -10 is greater than -6.
c) Zero is larger than every negative integer.

❖ VIDEO-LINKS

LINK-1

<https://youtu.be/o3kIi8g3mwI> (press CTRL while going to this link)

DAY-2

❖ TEACHING MATERIAL

Properties of addition of integers

- ★ **Closure property:** The sum of two integers is always integer.
- ★ **Commutative property:-** $a + b = b + a$
- ★ **Associative property :-** $a + (b + c) = (a + b) + c$

Related questions

1. Evaluate

a) $15 + (-8)$ b) $(-7) + (-23)$ C) $(-32) + 8$

2. If $a = -8$, $b = -7$ and $C = 6$, show that $(a + b) + c = a + (b + c)$

❖ VIDEO-LINKS

<https://youtu.be/0mBYJa190D0> (press CTRL while going to this link)

DAY-3

Recapitulation of properties of addition of integers.

- ★ **Existence of additive identity :-** $a + 0 = 0 + a = a$
- ★ **Existence of additive inverse:-** The opposite of an integer a is $-a$.
eg the additive inverse of 5 is -5

Related questions:-

1. Find the additive inverse of the following

a) -83 b) 256 c) -2001

2. Write a pair of integers whose sum gives

- a) zero
- b) a negative integer
- c) an integer smaller than both the integers.

DAY-4

Topic :- Properties of Subtraction of integers

- ★ **Closure property:-** $a - b$ is always an integer
- ★ Subtraction of integers is not commutative.
- ★ Subtraction of integers is not associative.

Related questions

- Subtract
 - a) 28 from -42
 - b) 318 from 0
 - c) -153 from -240
- The sum of two integers is -16. If one of them is 53, find the other.
- Find $36 - (-64)$ and $(-64) - 36$. Are they equal.

adding and subtracting positive and negative
INTEGERS

Adding Integers of the same sign

$10 + 5 =$ *OR* $(-5) + (-7) =$

find the absolute value of each number

$|10| + |5| =$ $| -5 | + | -7 | =$

add the absolute value of each number

$10 + 5 = 15$ $5 + 7 = 12$

the result gets the same sign as the addends

$= 15$ $= -12$

Adding Integers of opposite signs

$-12 + 8 =$ *OR* $6 + (-7) =$

find the absolute value of each number

$| -12 | + | 8 | =$ $| 6 | + | -7 | =$

subtract the smaller absolute value from the larger

$12 - 8 = 4$ $7 - 6 = 1$

the result gets sign from the larger absolute value

$= -4$ $= -1$

Subtracting Integers

$11 - (-7) =$ *OR* $-9 - (-3) =$

convert the subtracted number to its opposite

$11 + 7 =$ $-9 + 3 =$

add the numbers

$11 + 7 = 18$ $-9 + 3 = -6$

DAY-5

Topic:-

Multiplication of integers:- To find the product of two integers with unlike signs, we find the product of their values regardless of their signs and give a minus sign to the product.

For eg:- $6 \times (-5) = -30$

Properties of multiplication of integers:-

- ★ **Closure property** :- the product of two integers is always integers
- ★ **Commutative property** :- $a \times b = b \times a$
- ★ **Associative property** :- $a \times (b \times c) = (a \times b) \times c$
- ★ **Distributive property** :- $a \times (b + c) = (a \times b) + (a \times c)$
- ★ **Existence of Multiplicative identity**:- For every integer a, we have
 $a \times 1 = a$
- ★ **Property of zero** :- For every integer a, we have $(a \times 0) = (0 \times a) = 0$

Related questions

Multiply

a) 16×9 b) -67×4 c) -56×5

Find each of the following products:-

a) $3 \times 4 \times (-5)$ b) $2 \times (-5) \times (-6)$

What will be the sign of the product, if we multiply 90 negative integers and 9 positive integers.

What will be the sign of the product, if we multiply 103 negative integers and 65 positive integers.

- **Division of integers** :- Division is an inverse process of multiplication.
- **Properties of division of integers**
 - If a and b are integers then $a \div b$ is not necessarily an integer.
 - If a is an integer and a is not equal to 0, then $a \div a = 1$
 - If a is an integer, then $(a \div 1) = a$

Negative \div Negative =

Example: $-15 \div -3$

Step 1: Determine the sign

negative \div negative = positive

Step 2: Pretend the numbers are positive and divide

$$15 \div 3 = 5$$

Step 3: Solution!

positive 5 = 5

Related questions

- Multiply

a) 16×9 b) -67×4 c) -56×5

Find each of the following products:-

a) $3 \times 4 \times (-5)$ b) $2 \times (-5) \times (-6)$

- What will be the sign of the product, if we multiply 90 negative integers and 9 positive integers.
- What will be the sign of the product, if we multiply 103 negative integers and 65 positive integers.

❖ VIDEO-LINKS

1. <https://youtu.be/P4sOrmoxoqOs>

2. https://youtu.be/nv_LHrcPBWw

3. <https://youtu.be/i5QqmtjMUCg>


Ppt link

https://www.google.com/url?sa=t&source=web&rct=j&url=https://slideplayer.com/slide/5363971/&ved=2ahUKEwi53tKEwMHoAhWA6nMBHQtpAL8Qo7QBMA6BAGAEAI&usg=AOvVaw284cNY_vZPtznoBDr-AM0

Worksheets:-

Adding Integers

Complete the number line.



Complete the addition problems.

$\begin{array}{r} -2 \\ + 3 \end{array}$	$\begin{array}{r} +4 \\ + -2 \end{array}$	$\begin{array}{r} +5 \\ + -1 \end{array}$	$\begin{array}{r} -6 \\ + +2 \end{array}$	$\begin{array}{r} +8 \\ + +2 \end{array}$	$\begin{array}{r} -1 \\ + -5 \end{array}$	$\begin{array}{r} -9 \\ + +8 \end{array}$
$\begin{array}{r} +7 \\ + +3 \end{array}$	$\begin{array}{r} -3 \\ + +6 \end{array}$	$\begin{array}{r} -4 \\ + +5 \end{array}$	$\begin{array}{r} +9 \\ + -7 \end{array}$	$\begin{array}{r} +6 \\ + -7 \end{array}$	$\begin{array}{r} -5 \\ + +6 \end{array}$	$\begin{array}{r} -4 \\ + +3 \end{array}$

Q. The sum of two integers is -11. If one of them is 9. Find the other.

Q. Add the product of (-16) and (-9) to the quotient of (-132) by 6.

Q. A shopkeeper gains ₹1 on each pen and losses 40 paise on each pencil. He sells 45 pens and some pencils losing ₹5 in all. How many pencils does he sell?

Find the sum.

1. $6 + -12 + 2 =$ _____ 2. $11 + 14 + -2 =$ _____

3. $-12 + -5 + -10 =$ _____ 4. $5 + 13 + 6 =$ _____

5. $1 + -13 + 14 =$ _____ 6. $1 + 14 + 17 =$ _____

7. $6 + 20 + 15 =$ _____ 8. $0 + -8 + -7 =$ _____

9. $3 + 10 + -15 =$ _____ 10. $3 + -16 + -16 =$ _____

11. $-18 + -5 + 3 =$ _____ 12. $18 + 15 + 14 =$ _____

13. $-14 + 4 + 5 =$ _____ 14. $-5 + 17 + -15 =$ _____

15. $5 + -16 + 15 =$ _____ 16. $3 + -6 + 17 =$ _____

17. $-19 + -8 + -15 =$ _____ 18. $-9 + 4 + 15 =$ _____

ACTIVITY -1

TOPIC: INTEGERS

TITLE: MULTIPLICATION OF INTEGERS

1. What we have to do?

To apply the multiplication of integers by playing a game.

2. What is required?

Chart paper, a pair of scissors, geometry box, adhesive, colours, 2 white colour dice for positive integers and 2 red colour dice for negative integers.



3. How much time is required?

30 - 40 minutes

4. What do you need to know?

Knowledge about basic operations and concept of integers

5. How will you proceed?

- Draw 11×7 grid on a chart paper.
- Write the integers from (- 36) to (+36) in each box, leaving the first two and last two boxes blank and colour the boxes pink which contain negative integers. as shown in the Fig.1.

		+36	+35	+34	+33	+32	+31	+30	+29	+28
+17	+18	+19	+20	+21	+22	+23	+24	+25	+26	+27
+16	+15	+14	+13	+12	+11	+10	+9	+8	+7	+6
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16
-27	-26	-25	-24	-23	-22	-21	-20	-19	-18	-17
-28	-29	-30	-31	-32	-33	-34	-35	-36		

Fig.1

- c. Three chances will be given to each player:
- For two positive integers (use 2 white dice)
 - For one negative and one positive integer (use 1 red dice and 1 white dice)
 - For two negative integers (use 2 red dice)
- d. Two dice will be thrown simultaneously by each player and after every throw the player has to multiply the numbers (keeping in mind their signs) reflected on the top of the dice.
- e. If the product is negative, the player will move his counter towards (-36), starting from the digit 0 and if the product is positive the player will move his counter towards (+36).
- f. The player who reaches (+36) first will be the winner.

6. What have you observed?

	<u>Player1</u> Integer reflected on both the dice		$a \times b$	<u>Player2</u> Integer reflected on both the dice		$a \times b$
Chance 1	a = _____	b=_____	_____	a = _____	b=_____	_____
Chance 2	a = _____	b=_____	_____	a = _____	b=_____	_____
Chance 3	a = _____	b=_____	_____	a = _____	b=_____	_____

7. What have you learnt?

8. Extended Activity

What will be the sign of the product you get, if you multiply 15 negative integers and 7 positive integers?

Real life Applications:

The above concept is used in our day-to-day life incidents viz. measuring temperature, in banking operations, sports, market place, games etc....

Mind map

