Title: Understanding Integers - A Complete Guide for Indian School Students

Page 1: Introduction to Integers

Welcome, students! In this guide, we will explore the world of **integers**. Integers are one of the most important topics in mathematics, especially from Class 6 onwards. Whether you're measuring temperatures, counting money, or checking cricket scores, integers are everywhere!

Definition: Integers are whole numbers that can be **positive**, **negative**, or **zero**.

Examples: -5, -2, 0, 3, 7

Page 2: The Set of Integers

The set of integers is written as:

Z = {..., -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...}

This includes:

- **Positive Integers**: 1, 2, 3, ...
- **Negative Integers**: -1, -2, -3, ...
- **Zero (0)**: Neither positive nor negative

Page 3: Number Line

Integers can be shown on a **number line**.

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-4 -3 -2 -1 0 1 2 3 4

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- Numbers to the right are larger

- Numbers to the left are smaller

- Zero is at the center
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Page 4: Comparing Integers

To compare integers:

- A positive number is always greater than a negative number

- Among negatives, the number with **smaller absolute value** is greater

Examples:

- 3 > -2

- -2 > -5

Page 5: Absolute Value

The **absolute value** of a number is its distance from zero, without considering sign.

Examples:

- |5| = 5

- |-5| = 5

- |0| = 0

Absolute value is always **non-negative**.

Page 6: Addition of Integers (Same Signs)

When both integers have the **same sign**:

- Add the values

- Keep the same sign

Examples:

- (-3) + (-5) = -8

- (+4) + (+2) = +6

Page 7: Addition of Integers (Different Signs)

When the integers have **different signs**:

- Subtract the smaller absolute value from the larger

- Keep the sign of the larger number

Examples:

- (+7) + (-3) = +4

- (-9) + (+5) = -4

Page 8: Subtraction of Integers

Subtraction is like adding the opposite:

Rule: a - b = a + (-b)

Examples:

- 5 - 3 = 2

- 5 - (-3) = 5 + 3 = 8

- (-4) - (+2) = -4 + (-2) = -6

Page 9: Multiplication of Integers

Rules:

- (+) x (+) = +
- (-) x (-) = +
- (+) x (-) = -
- (-) x (+) = -

Examples:

- 3 x 4 = 12
- (-2) x (-3) = 6
- (-5) x 2 = -10

Page 10: Division of Integers

Rules are similar to multiplication:

- (+) / (+) = +
- (-) / (-) = +
- (+) / (-) = -
- (-) / (+) = -

Examples:

- 10 / 2 = 5
- (-12) / (-4) = 3
- 12 / (-3) = -4

Page 11: Properties of Integers

- **Closure**: a + b is an integer
- **Commutative**: a + b = b + a
- **Associative**: (a + b) + c = a + (b + c)
- **Distributive**: a(b + c) = ab + ac

Page 12: Word Problems (Addition & Subtraction)

1. Riya deposits Rs.500 in her account and later withdraws Rs.200. What is the final balance?

2. Temperature at 6 am is -4°C. It rises by 6°C. What is the new temperature?

3. A lift is on the 2nd floor. It goes down 5 floors. Which floor is it on now?

4. A submarine is 800m below sea level. It rises 300m. Where is it now?

Page 13: Word Problems (Multiplication & Division)

1. A loss of Rs.20 per item on 5 items. What is the total loss?

2. Dividing -30 among 5 people. How much does each person get?

3. Each day the temperature drops by 2°C. What is the total drop in 6 days?

4. A company lost Rs.5000 over 10 months. What is the average monthly loss?

Page 14: Daily Life Uses of Integers

- Temperature (weather reports)
- Bank balance (profit/loss)
- Cricket score (runs scored/lost)
- Elevator levels (above and below ground)
- Exams (marks gained/lost)

Page 15: Fun Activity - Integer Game

Play a number line jump:

- Positive jump to the right
- Negative jump to the left
- Start at 0 and keep score!

You can create your own board game using these rules. Try playing with friends and see who scores highest!

Page 16: Common Mistakes to Avoid

- Forgetting sign during operations

- Mixing up subtraction rules

- Thinking -3 is more than -1 (It's not!)

Always draw a number line to help!

Page 17: Practice Worksheet (Part 1)

1. (-3) + 5 = ?

2. 7 - (-4) = ?

3. -8 x -2 = ?

4. 12 ÷ (-3) = ?

5. Arrange: -4, 2, 0, -1, 3

Page 18: Practice Worksheet (Part 2)

6. Find | -9 |

7. (-6) + (-3) = ?

8. (-15) - (-5) = ?

9. A plane is at -500 ft. It climbs 1200 ft. Where is it now?

10. Bank balance starts at 0, deposit Rs.1000, withdraw Rs.1500. Balance?

Page 19: Summary of Key Points

- Integers include negative numbers, zero, and positive numbers
- Zero is neutral
- Use number line for clarity
- Follow sign rules carefully in operations
- Practice word problems regularly

Page 20: More Word Problems to Solve

1. The temperature in Shimla is -2°C. It drops by 5°C at night. What is the new temperature?

2. Ravi had Rs.250. He bought a book for Rs.320. How much more money does he need?

3. A ship is sailing at 40m below sea level. It dives 70m more. What is its new position?

4. A cricket team scores 250 runs. In the next match, they score 45 runs less. What is their score?

5. A farmer made Rs.1000 profit in the first month and Rs.600 loss in the second. What is the total profit/loss?

Congratulations! You have now mastered the basics of **integers**!