

GRADE 8 | 2024

Numbers, Integers & Fractions

Mathematics

CAPS ALIGNED

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1. The Number System

Grade 8 mathematics builds on the number system. You will work with natural numbers, whole numbers, integers, rational numbers and irrational numbers.

- Natural numbers: 1, 2, 3, ... (counting numbers)
- Whole numbers: 0, 1, 2, 3, ...
- Integers: ..., -3, -2, -1, 0, 1, 2, 3, ...
- Rational numbers: can be written as a fraction p/q where q is not 0
- Irrational numbers: cannot be written as a fraction (e.g. $\sqrt{2}$, π)

2. Working with Integers

Rules for Addition and Subtraction

When adding integers, same signs ADD, different signs SUBTRACT and keep the sign of the larger number.

EXAMPLE: Adding integers

$(-5) + (-3) = -8$ (same signs: add, keep negative)

$(-5) + 3 = -2$ (different signs: subtract $5-3=2$, keep sign of -5)

FORMULA: $(-a) + (-b) = -(a+b)$ | $(-a) + b = b - a$ (when $b > a$)

Rules for Multiplication and Division

- Positive x Positive = Positive
- Negative x Negative = Positive
- Positive x Negative = Negative
- Negative x Positive = Negative

KEY POINT: Same signs give a POSITIVE result. Different signs give a NEGATIVE result.

3. Fractions

Adding and Subtracting Fractions

To add or subtract fractions, first find a common denominator (LCD). Then add or subtract the numerators.

FORMULA: $a/b + c/d = (ad + bc) / bd$

EXAMPLE: Adding fractions

$1/3 + 1/4 = 4/12 + 3/12 = 7/12$

LCD of 3 and 4 is 12.

Multiplying and Dividing Fractions

FORMULA: $a/b \times c/d = ac/bd$ $a/b \div c/d = a/b \times d/c = ad/bc$

EXAMPLE: Dividing fractions

$2/3 \div 4/5 = 2/3 \times 5/4 = 10/12 = 5/6$

4. Percentages

A percentage is a fraction with denominator 100.

FORMULA: % of a number: $(\text{percentage}/100) \times \text{number}$

Percentage increase: $(\text{increase}/\text{original}) \times 100$

TIP: To convert a fraction to a percentage, divide numerator by denominator then multiply by 100.