



Integers and Fractions

Grade 7 Mathematics: operating on positive and negative numbers, and on fractions

Learning Intentions and Success Criteria

- I can locate positive and negative numbers on a horizontal or vertical number line and compare them using $<$, $>$, or $=$.
- I can add and subtract integers by expressing subtraction as addition of the opposite.
- I can multiply and divide integers and predict whether the result is positive or negative.
- I can add, subtract, multiply, and divide positive fractions and mixed numbers.
- I can explain why dividing by a fraction means multiplying by its reciprocal.

The Number Line: Grade 6 Foundations

Positive and Negative Numbers

Negative numbers sit to the left of zero on a horizontal line, or below zero on a vertical line. Zero itself is neither positive nor negative. Every positive number has an opposite negative number with the same magnitude, called an additive inverse.

Why This Matters

Negative numbers describe real situations such as temperature, debt, and elevation below sea level. Magnitude is the distance from zero, so -7 and 7 have the same magnitude but point in opposite directions.

Adding and Subtracting Integers

1

Start with the expression

The symbol negative sign can mean a negative number or subtraction, so read the expression carefully.

2

Rewrite subtraction as addition

a minus b is the same as a plus the opposite of b, adding the opposite.

3

Combine using integer rules

Adding a number and its opposite gives zero; two positives sum to a positive; two negatives sum to a negative.

4

Check reasonableness

Estimate the answer's sign and size before finalizing it.

5

Apply to fractions and decimals too

The same addition and subtraction ideas work with fractions using common denominators.

Multiplying and Dividing: Integers and Fractions

Positive times positive or negative times negative

The product is always positive.

Positive times negative

The product is always negative.

Fraction times fraction

Multiply numerators together and denominators together: a/b times c/d equals ac/bd , useful for adjusting a recipe.

Fraction divided by fraction

Dividing by a fraction means multiplying by its reciprocal: a/b divided by c/d equals a/b times d/c .

Order of operations

The conventional order of operations applies to integers, fractions, and decimal numbers alike.

Checking your work

Assess whether a product or quotient makes sense by estimating first.

Bringing Integers and Fractions Together

This unit builds toward demonstrating an understanding of adding and subtracting positive fractions and mixed numbers with like and unlike denominators, and adding and subtracting integers concretely, pictorially, and symbolically. Next year's math extends multiplication and division of integers and eventually joins integers and fractions into the full set of rational numbers.

If you can already order integers on a number line, how would you order fractions like $\frac{3}{4}$ and $\frac{5}{6}$ on that same line, and where would a negative fraction like negative $\frac{3}{4}$ belong?