



IGCSE Math Notes: The Four Operations



1. The Four Basic Operations

1. Addition (+)
2. Subtraction (-)
3. Multiplication (\times or \cdot)
4. Division (\div or $/$)

These operations are used with:

- Integers
 - Fractions
 - Decimals
-



2. Operations with Integers



Addition and $=$ Subtraction

- Positive + Positive = Positive
Example: $5 + 3 = 8$
- Negative + Negative = More Negative
Example: $-4 + (-6) = -10$
- Positive + Negative = Subtract smaller from larger and keep sign of the larger
Example: $7 + (-10) = -3$

Subtraction is the same as adding the opposite:

Example:

$$5 - (-2) = 5 + 2 = 7$$



✖ Multiplication and \div Division

Rules for signs:

Operation	Result Sign
$+$ \times $+$ or $-$ \times $-$	Positive
$+$ \times $-$ or $-$ \times $+$	Negative

Examples:

- $(-4) \times 3 = -12$
- $(-6) \div (-2) = 3$
- $8 \div (-4) = -2$

✚ 3. Operations with Fractions**✚ Addition and $=$ Subtraction**

Make denominators the same before combining.

Example 1:

$$\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$$

Example 2:

$$\frac{5}{8} - \frac{3}{4} = \frac{5}{8} - \frac{6}{8} = -\frac{1}{8}$$

✖ MultiplicationMultiply top \times top and bottom \times bottom.

Example:

$$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$$

 \div Division

Flip the second fraction and multiply.

Example:

$$\frac{3}{4} \div \frac{2}{5} = \frac{3}{4} \times \frac{5}{2} = \frac{15}{8}$$

4. Operations with Decimals

Addition and Subtraction

- Line up the decimal points before calculating.

Example:

$$5.63 + 2.1 = 7.73$$

Multiplication

- Ignore decimals, multiply as whole numbers, then count **total decimal places**.

Example:

$$1.2 \times 0.3 = (12 \times 3) = 36 \rightarrow 0.36 \quad (2 \text{ decimal places})$$

Division

- If the divisor is a decimal, multiply both the dividend and divisor by 10 or 100 to make divisor a whole number.


Example:

$$6.4 \div 0.2 = \frac{64}{2} = 32$$

5. Order of Operations (BIDMAS/BODMAS)

BIDMAS stands for:

- Brackets
- Indices (powers/roots)
- Division
- Multiplication
- Addition
- Subtraction

 Do operations in this order

Example:

$$5 + 2 \times (3 + 4)^2 \div 7$$

Step-by-step:

- Brackets: $3 + 4 = 7$
- Indices: $7^2 = 49$
- Multiply/Divide: $2 \times 49 = 98$, then $98 \div 7 = 14$
- Add: $5 + 14 = 19$

 Final Answer: 19



6. Mixed Example with Brackets & Fractions

Question:

$$2 + \left(\frac{3}{4} \times (5 - 2) \right) \div \frac{1}{2}$$

Step-by-step:

- Brackets: $5 - 2 = 3$
- Multiply: $\frac{3}{4} \times 3 = \frac{9}{4}$
- Divide: $\frac{9}{4} \div \frac{1}{2} = \frac{9}{4} \times \frac{2}{1} = \frac{18}{4} = \frac{9}{2}$
- Add: $2 + \frac{9}{2} = \frac{4}{2} + \frac{9}{2} = \frac{13}{2} = 6.5$



Final Answer: 6.5