

# Number

## KEY TERMS

Learn these words first. EQAO questions often test whether you understand what the math language means.

### Integer

A whole number that can be positive, negative, or zero.

Ex: -4, 0, 12

### Rational Number

A number that can be written as a fraction  $a/b$ , where  $b$  is not 0.

Ex:  $0.75 = 3/4$

### Irrational Number

A number that cannot be written as an exact fraction; its decimal does not end or repeat.

Ex:  $\pi$ ,  $\sqrt{2}$

### Real Number

Any rational or irrational number found on the number line.

Ex: -5,  $2/3$ ,  $\pi$

### Absolute Value

The distance a number is from 0; distance is never negative.

Ex:  $|-7| = 7$

### Ratio

A comparison of two quantities using the same or different units.

Ex: 2 red : 3 blue

### Rate

A ratio comparing quantities with different units.

Ex: 90 km in 1.5 h

### Unit Rate

A rate written for exactly 1 unit of the second quantity.

Ex: \$3.20 per 1 kg

### Proportion

An equation showing that two ratios are equal.

Ex:  $2/3 = 8/12$

### Percent

A ratio out of 100.

Ex:  $35\% = 35/100$

### Base

The number that is repeatedly multiplied in a power.

Ex: In  $5^3$ , base = 5

### Exponent

Tells how many times the base is used as a factor.

Ex:  $5^3 = 5 \times 5 \times 5$

### Scientific Notation

A compact way to write very large or small numbers as  $a \times 10^n$ .

Ex:  $6.2 \times 10^5$

### Square Root

A number that multiplies by itself to make the original number.

Ex:  $\sqrt{49} = 7$

## KEY CONCEPTS & DEFINITIONS

### Number Sets

Natural, whole, integer, rational, irrational and real numbers describe different groups. A number can belong to more than one group.

Think: smaller sets fit inside larger sets.

### Equivalent Forms

Fractions, decimals and percents can represent the same value. Converting forms helps you compare quantities.

$1/4 = 0.25 = 25\%$

### Rates & Proportions

Rates compare quantities. A proportion lets you find a missing value when two ratios describe the same relationship.

Keep units attached to numbers.

### Powers & Reasonableness

Exponent rules simplify repeated multiplication. Estimation helps you catch impossible calculator answers.

Estimate first, calculate second.

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## FORMULAS & RULES

### PERCENT

$$\text{percent} = (\text{part} / \text{whole}) \times 100$$

Use when a question asks what percent one amount is of another.

### PERCENT CHANGE

$$\text{change \%} = (\text{change} / \text{original}) \times 100$$

Use the original amount in the denominator.

### PROPORTION

$$a/b = c/d \rightarrow ad = bc$$

Cross products are equal when the ratios are proportional.

### EXPONENT LAWS

$$a^m \times a^n = a^{(m+n)} \quad | \quad a^m / a^n = a^{(m-n)}$$

Same base: add exponents when multiplying; subtract when dividing.

## VISUALS & FAST FACTS

### VISUAL MEMORY AID: NUMBER LINE + EQUIVALENCE



Same value, different form

**FAST FACTS:** Scientific notation has  $1 \leq a < 10$ . | A negative exponent makes a small decimal, not a negative number. | Always compare quantities using compatible units.

## THREE WORKED EXAMPLES

### Percent Change

1

A price rises from \$80 to \$92. What is the percent increase?

- Change =  $92 - 80 = 12$ .
- $12 / 80 = 0.15$ .
- $0.15 \times 100 = 15\%$ .

**ANSWER**  
15% increase

### Unit Rate

2

A car travels 270 km in 3 hours. Find the unit rate.

- Rate = distance / time.
- $270 / 3 = 90$ .
- Attach the units: km per hour.

**ANSWER**  
90 km/h

### Scientific Notation

3

Write 4,500,000 in scientific notation.

- Move the decimal after the first non-zero digit: 4.5.
- The decimal moved 6 places left.
- Use a positive exponent:  $10^6$ .

**ANSWER**  
 $4.5 \times 10^6$