

Algebra

KEY TERMS

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

Variable

A letter or symbol that represents a value that can change.

Ex: x in $3x + 2$

Coefficient

A number multiplying a variable.

Ex: 7 in $7x$

Constant

A number with no variable attached.

Ex: 5 in $2x + 5$

Term

One part of an expression separated by + or - signs.

Ex: $3x$, $-2y$, 7

Expression

A mathematical phrase with numbers, variables and operations but no equals sign.

Ex: $4x + 9$

Equation

A statement saying two expressions are equal.

Ex: $3x + 2 = 17$

Inequality

A comparison using $<$, $>$, $\leq$ or $\geq$ instead of $=$.

Ex: $x > 4$

Like Terms

Terms with exactly the same variable part and exponents.

Ex: $3x$ and $-5x$

Linear Relation

A relationship with a constant rate of change; its graph is a straight line.

Ex: $y = 2x + 1$

Independent Variable

The input you choose or control; usually x .

Ex: time in a distance graph

Dependent Variable

The output that changes because of the input; usually y .

Ex: distance depends on time

Slope / Rate of Change

How much y changes for each 1-unit change in x .

Ex: rise/run = $\frac{3}{2}$

Y-intercept / Initial Value

The y -value when $x = 0$; where the line crosses the y -axis.

Ex: b in $y = mx + b$

Point of Intersection

A point where two graphs meet; it satisfies both relations.

Ex: (4, 10)

Table of Values

A table of matching x - and y -values used to identify or graph a relation.

Ex: x : 0,1,2; y : 3,5,7

Algorithm

A clear sequence of steps used to solve a problem or complete a task.

Ex: steps in a program

Parameter

A value that controls how a rule, model or program behaves.

Ex: rate = 2 in $y = 2x + 1$

Loop

A coding structure that repeats instructions.

Ex: repeat 5 times

KEY CONCEPTS & DEFINITIONS

Balance Principle

An equation stays true only if you perform the same operation on both sides.

Undo operations in reverse order.

Linear Means Constant Change

Equal changes in x cause equal changes in y . That constant change is the slope.

Straight line = constant rate.

Slope and Intercept Tell a Story

In $y = mx + b$, m tells the rate and b tells the starting value. Always interpret them in context.

m = rate, b = start.

Representations Connect

The same relation can appear as words, an equation, a table or a graph. You should be able to move between them.

Words $\leftrightarrow$ table $\leftrightarrow$ graph $\leftrightarrow$ equation

Algebra

FORMULAS & RULES

SLOPE

$$m = (y_2 - y_1) / (x_2 - x_1)$$

Change in y divided by change in x.

SLOPE-INTERCEPT FORM

$$y = mx + b$$

m = slope; b = y-intercept / initial value.

DISTRIBUTIVE PROPERTY

$$a(b + c) = ab + ac$$

Multiply the outside factor by every term inside the brackets.

SOLVING EQUATIONS

Do the same operation to both sides

Goal: isolate the variable while keeping the equation balanced.

VISUALS & FAST FACTS

VISUAL MEMORY AID: SLOPE = RISE / RUN



FAST FACTS: Positive slope rises left to right; negative slope falls. | Horizontal line: slope 0. Vertical line: slope undefined. | A point of intersection is a solution to both relations.

THREE WORKED EXAMPLES

Solve an Equation

Solve $4x + 7 = 31$.

1

- Subtract 7 from both sides: $4x = 24$.
- Divide both sides by 4.
- $x = 6$.

ANSWER

$$x = 6$$

Find the Slope

Find the slope through (2, 3) and (6, 11).

2

- Change in $y = 11 - 3 = 8$.
- Change in $x = 6 - 2 = 4$.
- $m = 8 / 4 = 2$.

ANSWER

$$\text{slope} = 2$$

Interpret $y = mx + b$

A taxi cost is $C = 3d + 5$, where d is km.

3

- $m = 3$ means \$3 per km.
- $b = 5$ means a \$5 starting fee.
- At $d = 4$: $C = 3(4) + 5 = 17$.

ANSWER

\$17 for 4 km