

EQUATION, IDENTITY, EXPRESSION, FORMULA

EQUATION = TRUE FOR SOME VALUES
 $5(x+3) = 3x + 23$
 $5x + 15 = 3x + 23$
 $5x - 3x = 23 - 15$
 $2x = 8$
 $x = 4$

IDENTITY = TRUE FOR ALL VALUES
 $5(x+3) - 2(x-4) \equiv 3x + 23$
 $5x + 15 - 2x + 8 \equiv 3x + 23$
 $3x + 23 \equiv 3x + 23$

EXPRESSION NO EQUALS SIGN
 $x^2 + 3x + 5$
 WHEN $x = 7$
 $7^2 + 3(7) + 5 = 49 + 21 + 5 = 75$

FORMULA A RULE LINKING TWO OR MORE VARIABLES
 $V = \frac{1}{3}\pi r^2 h$
 $3V = \pi r^2 h$
 $\frac{3V}{\pi r^2} = h$

USING FORMULAE

SUBSTITUTE
 $a = 20$
 $b = -2$
 $c = 6$
 $y = 5a + b + c$
 $y = 5(20) + (-2) + 6$
 $y = 100 - 2 + 6$
 $y = 104$

REARRANGE
 $y = 5a + b + c$
 $5a = y - b - c$
 $a = \frac{y - b - c}{5}$

MAKE X THE SUBJECT
 $p = \sqrt{\frac{x+3}{3}}$
 $p^2 = \frac{x+3}{3}$
 $3p^2 = x+3$
 $3p^2 - 3 = x$
 $x = 3(p^2 - 1)$

NOTATION

USE IN PLACE OF...

ab	$a \times b$
$3y$	$y + y + y$
a^3	$a \times a \times a$
$\frac{a}{b}$	$a \div b$

FUNCTIONS

WHEN $x = 10$
 $y = 5x - 3$
 $y = 5(10) - 3$
 $y = 50 - 3$
 $y = 47$

WHEN $y = 32$
 $32 = 5x - 3$
 $32 + 3 = 5x$
 $35 = 5x$
 $x = 7$

INPUT x **OUTPUT** y

INEQUALITIES

LESS THAN $<$
LESS THAN OR EQUAL $\leq$
GREATER THAN $>$
GREATER THAN OR EQUAL $\geq$

SOLVING LINEAR INEQUALITIES

COLLECT X'S ON THE LEFT
 $3x - 8 < 7x + 12$
 $3x - 7x < 12 + 8$
 $-4x < 20$
 $x > -5$

COLLECT X'S ON THE RIGHT
 $-8 - 12 < 7x - 3x$
 $-20 < 4x$
 $-5 < x$

LINEAR EQUATIONS

WITH BRACKETS
 $3(2x - 5) = 20 - x$
 $6x - 15 = 20 - x$
 $6x + x = 20 + 15$
 $7x = 35$
 $x = 5$

WITH FRACTIONS
 $\frac{3x-2}{4} - \frac{2x+5}{3} = \frac{1-x}{6}$
 $3(3x-2) - 4(2x+5) = 2(1-x)$
 $9x - 6 - 8x - 20 = 2 - 2x$
 $9x - 8x + 2x = 2 + 6 + 20$
 $3x = 28$
 $x = \frac{28}{3}$

SEQUENCES

ARITHMETIC SEQUENCES
 TERM $\pm$ SAME AMOUNT $\rightarrow$ TERM

1st TERM: 2
 2nd TERM: 6
 3rd TERM: 18
 4th TERM: 54
 5th TERM: 162

FIBONACCI SEQUENCES
 ADD THE PREVIOUS TWO TERMS TO GET THE NEXT ONE

1 1 2 3 5 8 13 21

BRACKETS

SINGLE BRACKET
 $2xy(3x^2 - y)$
 $2xy \times 3x^2 - 2xy \times y$
 $6x^3y - 2xy^2$

DOUBLE BRACKET
 $(x+5)(x-2)$
 $x^2 - 2x + 5x - 10$
 $x^2 + 3x - 10$

SIMULTANEOUS EQUATIONS

SOLVE SIMULTANEOUSLY
 $3x + 2y = 10$
 $5x - 3y = 42$

GRAPHICALLY

ELIMINATION METHOD
 $3x + 2y = 10$ (1)
 $5x - 3y = 42$ (2)
 $19x = 114$
 $x = 6$

GEOMETRIC SEQUENCES
 TERM $\times$ SAME AMOUNT $\rightarrow$ TERM

1st TERM: 2
 2nd TERM: 6
 3rd TERM: 18
 4th TERM: 54
 5th TERM: 162

QUADRATIC SEQUENCES
 STEPS CHANGE BY THE SAME AMOUNT

1 4 9 16 25
 2 7 12 17 22
 3 8 15 20 28

PERFECT SQUARE
 $(x+5)^2 = (x+5)(x+5)$
 $x^2 + 5x + 5x + 25$
 $x^2 + 10x + 25$

DIFFERENCE OF TWO SQUARES
 $(x+3)(x-3)$
 $x^2 + 3x - 3x - 9$
 $x^2 - 9$

SUBSTITUTION METHOD

REARRANGE (1) TO MAKE Y THE SUBJECT
 $3x + 2y = 10$
 $2y = 10 - 3x$
 $y = \frac{10 - 3x}{2}$

SUBSTITUTE INTO (2)
 $5x - 3(\frac{10 - 3x}{2}) = 42$
 $5x - \frac{30 - 9x}{2} = 42$
 $10x - 30 + 9x = 84$
 $19x = 114$
 $x = 6$

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SQUARE NUMBERS

1 4 9 16 25
 2 7 12 17 22
 3 8 15 20 28

GRAPHS OF DIFFERENT FUNCTIONS

LINEAR $y = x$
QUADRATIC $y = x^2$
CUBIC $y = x^3$
RECIPROCAL $y = \frac{1}{x}$

GRAPHS OF LINEAR FUNCTIONS
 $y = mx + c$

EQUAL GRADIENTS
GRADIENT
THE DIRECTION OF THE LINE
CHANGE IN Y OVER CHANGE IN X
PARALLEL LINES

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CUBE NUMBERS

1 8 27 64 125
 2 7 12 17 22
 3 8 15 20 28

GRAPHS OF QUADRATIC FUNCTIONS
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