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IMPORTANT PROPERTIES

Commutative Property For Addition

The order in which numbers are added does not affect the sum.

Example: $6 + 4 = 4 + 6$

Commutative Property For Multiplication

The order in which numbers are multiplied does not affect the product.

Example: $8 \times 3 = 3 \times 8$

Associative Property For Addition

The way in which numbers are grouped does not affect the sum.

Example: $7 + (3 + 2) = (7 + 3) + 2$

Associative Property For Multiplication

The way in which numbers are grouped does not affect the product.

Example: $(5 \times 2) \times 4 = 5 \times (2 \times 4)$

Distributive Property

To multiply a sum of numbers, either (1) add the numbers in parentheses and multiply the sum;

**Example: $4 \times (6 + 3) =$
 $4 \times (9) = 36$**

or (2) multiply the numbers separately, then add the products.

**Example: $4 \times (6 + 3) =$
 $(4 \times 6) + (4 \times 3) = 24 + 12 = 36$**

Identity Property For Addition

The sum of any number and 0 (zero) is that number.

Example: $7 + 0 = 7$, $486 + 0 = 486$

Identity Property For Multiplication

The product of any number and 1 (one) is that number.

Example: $9 \times 1 = 9$, $5840 \times 1 = 5840$

Opposites Property

If the sum of two numbers is 0 (zero), then each number is the opposite of the other.

Example: -4 is the opposite of $+4$ because $-4 + (+4) = 0$

Zero Property

The sum of 0 (zero) and any number is that number.

Example: $0 + 5 = 5$ and $5 + 0 = 5$

The product of 0 (zero) and any number is 0 (zero).

Example: $0 \times 6 = 0$ and $6 \times 0 = 0$

Equation Properties

When adding or subtracting the same number or multiplying or dividing by the same number on both sides of an equation, the result is still an equation.

**Examples: $n - 6 = 7$
 $n - 6 + 3 = 7 + 3$
 $n = 13$**

**$4n = 24$
 $(4n) \times 3 = 24 \times 3$
 $n = 6$**

SPECIAL MATHS HOW-TO'S

How to round a number to the nearest ten:

If the ones digit is five or more, round it to the next highest ten (46 rounds to 50).
If the ones digit is less than five, round to the next lowest ten (43 rounds to 40).

How to round a number to the nearest hundred:

If the tens digit is five or more, round to the next highest hundred (653 rounds to 700).
If the tens digit is less than five, round it to the next lowest hundred (638 rounds to 600).

How to round a number to the nearest thousand:

If the hundreds digit is five or more, round to the next highest thousand (4804 rounds to 5000). If the hundreds digit is less than five, round to the next lowest thousand (4204 rounds to 4000).

How to find an average:

To find the average of several numbers, add them together, then divide the sum by the number of numbers.

$$\begin{aligned} \text{The average of 12, 46, 75, 94, 101 and 38} &= (12 + 46 + 75 + 94 + 101 + 38) \div 6 \\ &= 366 \div 6 \\ &= 61 \end{aligned}$$

How to determine if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10:

A number is divisible by two if the last digit is 0, 2, 4, 6, or 8.

A number is divisible by three if the sum of its digits is divisible by 3.

A number is divisible by four if the last two digits are divisible by 4.

A number is divisible by five if the last digit is 0 or 5.

A number is divisible by six if the number is divisible by both 2 and 3.

A number is divisible by eight if the last three digits are divisible by 8.

A number is divisible by nine if the sum of its digits is divisible by 9.

A number is divisible by ten if the last digit is 0.

How to determine if two fractions are equivalent:

Cross-multiply the fractions. If both products are the same, the fractions are equivalent.

$$\frac{5}{6} \approx \frac{15}{18}$$

$$5 \times 18 = 90$$

$$6 \times 15 = 90$$

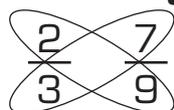
$$\frac{2}{3} \neq \frac{5}{7}$$

$$2 \times 7 = 14$$

$$3 \times 5 = 15$$

How to tell which of two fractions is greater:

Cross-multiply the two fractions.



1. Multiply the numerator of the first fraction by the denominator of the second fraction: 2×9
2. Multiply the denominator of the first fraction by the numerator of the second fraction: 3×7

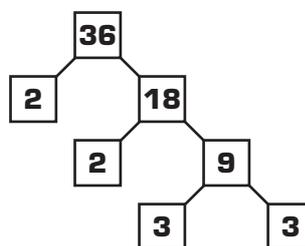
If the first multiplication has the greater product, the first fraction is greater.

If the second multiplication has the greater product, the second fraction is greater.

In this example, 18 is less than 21. Therefore $\frac{2}{3} < \frac{7}{9}$.

How to find prime factors:

Write every factor of a number.
Continue finding the factors of each factor until only prime numbers remain.
A factor tree will help.



How to find the least common multiple of two numbers:

Write several multiples for each number. Look for the smallest number that is common to both numbers.

$5 = 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55$

$9 = 9, 18, 27, 36, 45, 54, 63, 72$

For 5 and 9, 45 is the least common multiple.

How to find the least common denominator of two fractions:

Find the least common multiple of the two denominators.

For $\frac{7}{8}$ and $\frac{2}{5}$, 40 is the least common denominator.

How to find the greatest common factor of two numbers:

Write the factors for each number. Find the greatest factor that is common to both numbers.

The factors of 4 are 1, 2 and 4. The factors of 16 are 1, 2, 4, 8 and 16.

1, 2 and 4 are common factors. The greatest common factor is 4.

MATHS TERMS FOR EVERY OCCASION

Number Concepts & Relationships

Absolute Value – the distance a number is from zero on the number line

Abundant Number – any number for which the sum of its factors (other than the number itself) is greater than itself

Additive Inverse – for a given number, the number that can be added to give a sum of zero. -4 is the additive inverse of $+4$ because $-4 + (+4) = 0$

Base – a standard grouping of a numeration system
(If a numeration system groups objects by fives, it is called a base five system; in a base five system, the numeral 23 means two fives and three ones.)

Cardinal Number – the number of elements in a set

Composite Number – a number having at least one whole number factor other than one and itself

Coefficient – the number amount in a mathematical expression
In the expression $5x$, 5 is the coefficient of x .

Digit – a symbol used to write numerals (In the decimal system, there are ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.)

Disjoint Sets – sets having no members in common
The sets $\{1, 9, 7, 12\}$ and $\{3, 8, 11, 22\}$ are disjoint sets.

Elements – the members of a set

Empty Set – a set having no elements, also called a null set
 $\{ \}$ or \emptyset represents an empty set.

Equivalent Sets – sets having the same number of members

Even Number – one of the set of whole numbers having two as a factor

Expanded Notation – the method of writing a numeral to show the value of each digit
 $5327 = 5000 + 300 + 20 + 7$

Exponent – a numeral telling how many times a number is to be used as a factor
In 6^3 , the exponent is 3
 $6^3 = 6 \times 6 \times 6 = 216$

Finite Set – a set having a specific number of elements
 $\{2, 5, 9, 15\}$ is a finite set.