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Algebra 1 - REA's Quick Access Reference Chart (Quick Access Reference Charts)

FAST FACTS REVIEW

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ALGEBRA I

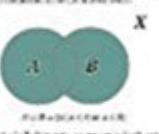
SETS AND SET OPERATIONS

A. ELEMENTS

- The word element is used in the sense of a member.
- The word set is used in the sense of a collection of elements.
- Set A is a set of elements. If a is an element of A , we say $a \in A$.
- Intersection of two sets A and B is the set of elements common to both sets. $A \cap B$ is the intersection of sets A and B .
- Universal set X is a set from which other sets are derived.
- Complement of a set A is the set of elements in the universal set X that are not in the set A .
- Set A is a subset of set B if every element of A is an element of B .

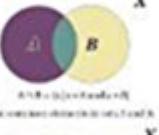
B. SET OPERATIONS

- Set operations may be represented graphically in Venn diagrams.
- Intersection of sets A and B :



$A \cap B = \{x | x \in A \text{ and } x \in B\}$

- Complement of a set A relative to a universal set X :



$A^c = \{x | x \in X \text{ and } x \notin A\}$

- Union of sets A and B :



$A \cup B = A \cap B^c$

C. LAWS OF SET OPERATIONS

- Commutative law of union: $A \cup B = B \cup A$.
- Associative law of union: $(A \cup B) \cup C = A \cup (B \cup C)$.
- Intersection is distributive over union: $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
- Complement is distributive over union: $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
- Complement is distributive over intersection: $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- De Morgan's law: $(A \cup B)^c = A^c \cap B^c$ and $(A \cap B)^c = A^c \cup B^c$.

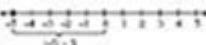
NUMBER SYSTEMS, ALGEBRAIC LAWS AND OPERATIONS

A. NUMBER SYSTEMS

- Whole numbers: the set of counting numbers and zero: e.g. $0, 1, 2, 3, \dots$.
- Integers: the set of whole numbers, negative whole numbers, and zero: e.g. $\dots, -2, -1, 0, 1, 2, \dots$.

B. ABSOLUTE VALUE

- Absolute value of a number a is the distance from a to zero on the number line.



$|a| = \begin{cases} a & \text{if } a \geq 0 \\ -a & \text{if } a < 0 \end{cases}$

C. ALGEBRAIC LAWS

- Commutative law: $a + b = b + a$.
- Associative law: $(a + b) + c = a + (b + c)$.
- Commutative law of multiplication: $a \cdot b = b \cdot a$.
- Associative law of multiplication: $(a \cdot b) \cdot c = a \cdot (b \cdot c)$.
- Distributive law: $a \cdot (b + c) = ab + ac$.
- Additive identity: $a + 0 = a$.
- Multiplicative identity: $a \cdot 1 = a$.
- Multiplicative inverse: $a^{-1} = 1/a$, if $a \neq 0$.
- Zero factor: $a \cdot 0 = 0$.
- Multiplicative identity: $a^0 = 1$ if $a \neq 0$; $a^0 = 0$ if $a = 0$.

D. DECIMALS

- Decimal: A decimal is a ratio for division in the decimal fraction system.
- Repeating decimal: a decimal that has a repeating digit or block of digits.
- Repeating decimal: a decimal that has a repeating pattern of digits.
- Scientific notation: a way of writing numbers that makes it easier to work with them. If $a \times 10^n$, then a is a real number such that $1 \leq a < 10$.

E. IMAGINARY AND COMPLEX NUMBERS

- Imaginary number: $i = \sqrt{-1}$.
- Complex numbers: numbers of the form $a + bi$, where a and b are real numbers.
- Conjugate of a complex number: $a + bi$ and $a - bi$.

F. EXPONENTS AND RADICALS

A. EXPONENTS

- Product of powers: $a^m \cdot a^n = a^{m+n}$.
- Quotient of powers: $a^m / a^n = a^{m-n}$.
- Negative exponent: $a^{-n} = 1/a^n$.
- Product of powers with exponents: $(a^m)^n = a^{mn}$.
- Quotient of powers with exponents: $(a^m)^n = a^{m-n}$.
- Power of a product: $(ab)^n = a^n b^n$.
- Power of a quotient: $(a/b)^n = a^n / b^n$.
- Product of conjugates: the product of two conjugates is a real number, e.g. $(3 + 2i)(3 - 2i) = 9 - 4i^2 = 13$.

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Synopsis

Fast Facts at Your Fingertips! REA's Quick Access Study Charts contain all the information students, teachers, and professionals need in one handy reference. They provide quick, easy access to important facts. The charts contain commonly used mathematical formulas, historical facts, language conjugations, vocabulary and more! Great for exams, classroom reference, or a quick refresher on the subject. Most laminated charts consist of 2 fold-out panels (4 pages) that fit into any briefcase or backpack. Each chart has a 3-hole punch for easy placement in a binder. Each chart measures 8 1/2" x 11"

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