Discrete Mathematics: Set Theory

Cardinality of a Set

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Cardinality of a Set

- The cardinality of a set A is the number of elements in A, which is written as $|A|$.
- An element of a set is any one of the **distinct** objects that make up that set.

Cardinality of a Set

- Note that this vertical-bar notation looks the same as absolute value notation, but the meaning of cardinality is different from absolute value.
- In particular, absolute value operates on numbers (e.g., $|-4| = 4$) while cardinality operates on sets (e.g., $|\{-4\}| = 1$).

Examples of cardinality

Examples

(i) $|\{2, 6, 7\}|$

(ii) $|\{5, 6, 5, 2, 2, 6, 5, 1, 1, 1\}|$

(iii) $|\{\ \}| = 0.$

(iv) $|\{\{1, 2\}, \{3, 4\}\}| = 2.$

Examples of cardinality

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(i) $|\{2, 6, 7\}|$

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Examples of cardinality

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(i) $|\{2, 6, 7\}| = 3$

(ii) $|\{5, 6, 5, 2, 2, 6, 5, 1, 1, 1\}| = |\{1, 2, 5, 6\}|$

Examples of cardinality

Examples

(i) $|\{2, 6, 7\}|$

(ii) $|\{5, 6, 5, 2, 2, 6, 5, 1, 1, 1\}| = |\{1, 2, 5, 6\}|$

Examples

(i) $|\{2, 6, 7\}| = 3$

(ii) $|\{5, 6, 5, 2, 2, 6, 5, 1, 1, 1\}| =$
$|\{1, 2, 5, 6\}| = 4$

Examples

(iii) $|\{\ \}|$

(iv) $|\{\{1,2\},\{3,4\}\}|$.

Examples

(iii) $|\{\ \}| = 0$.

The empty set has no elements.

(iv) $|\{\{1,2\},\{3,4\}\}| = 2$.

In this case the two elements of $\{\{1,2\},\{3,4\}\}$ are themselves sets: $\{1,2\}$ and $\{3,4\}$.

END