

Warm -up 8/27

- 1) Find n and the sum $1 + 2 + 3 + \dots + 26$
- 2) Find n and the sum $1 + 3 + 5 + \dots + 27$

Jan 24-7:41 AM



2.1: Set Theory



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Designating Sets

A **set** is a collection of elements or **members**.

<http://www.youtube.com/watch?v=zbkAF93qW5k>

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3 ways to describe a set:

Word description

The set of even counting numbers less than 10

The listing method

$\{2, 4, 6, 8\}$

Set Notation

$\{x \mid x \text{ is an even counting number less than } 10\}$

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Properties of Sets

Sets are commonly given names (capital letters).

$$A = \{1, 2, 3, 4\}$$

The set containing no elements is called the

_____ **set** (*null set*) and denoted by $\{\}$ or \emptyset .

To show 2 is an element of set A use the symbol \in .

$$2 \in \{1, 2, 3, 4\}$$

$$a \notin \{1, 2, 3, 4\}$$

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Sets of Numbers

Real numbers $\{x \mid x \text{ can be expressed as a decimal}\}$

Natural numbers (*counting*) $\{1, 2, 3, 4, \dots\}$

Whole numbers $\{0, 1, 2, 3, 4, \dots\}$

Integers $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

Rational numbers (Fractions) $\left\{\frac{p}{q} \mid p \text{ and } q \text{ are integers, with } q \neq 0\right\}$

May be written as a terminating decimal, like 0.25, or a repeating decimal like 0.333...

Irrational $\{x \mid x \text{ is not expressible as a quotient of integers}\}$ Decimal representations never terminate and never repeat.

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Example: Listing Elements of Sets

Give a complete listing of all of the elements of the set $\{x|x \text{ is a natural number between 3 and 8}\}$

Solution

{ , , , }

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Cardinality

The number of elements in a set is called the **Cardinal number**, or **cardinality** of the set.

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Example: Cardinality

Find the cardinal number of each set.

- a) $K = \{a, l, g, e, b, r\}$
- b) $M = \{2\}$
- c) \emptyset

Solution

- a) $n(K) = \underline{\quad}$
- b) $n(M) = \underline{\quad}$
- c) $n(\emptyset) = 0$

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Example: Equality of Sets

State whether the sets in each pair are equal.

- a) $\{a, b, c, d\}$ and $\{a, c, d, b\}$
- b) $\{2, 4, 6\}$ and $\{x|x \text{ is an even number}\}$

Solution

- a) Yes, order of elements does not matter
- b) No, $\{2, 4, 6\}$ does not represent all the even numbers.

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2.1: 1-8 all, 10-34 even

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Activity: Rally Coach

- Partner
- I write, 1 talk

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