Terminology for Section 1.1 and Lectures on Section 1.1

Concept	Comments	Examples
Natural numbers	Sometimes referred to as the *counting numbers*	1, 2, 3, 4, 5, . . .
Integers	Includes the natural numbers, their opposites, and 0	. . . , −2, −1, 0, 1, 2, . . .
Rational numbers	Includes integers; all fractions $\frac{p}{q}$, where p and q are integers with $q \neq 0$; all repeating and all terminating decimals	$\frac{1}{2}, -3, \frac{128}{6}, -0.335, 0,$ $0.25 = \frac{1}{4}, 0.\overline{33} = \frac{1}{3}$, and all fractions
Irrational numbers	Can be written as nonrepeating, nonterminating decimals; cannot be a rational number; a square root of a positive integer that is not an integer is an irrational number.	$\pi, \sqrt{2}, -\sqrt{5}, \sqrt[3]{7}$, and π^4
Real numbers	Any number that can be expressed in standard, or decimal, form Includes the rational numbers and irrational numbers	$\pi, \sqrt{7}, -\frac{4}{7}, 0, -10, 1.237$ $0.\overline{6} = \frac{2}{3}, 1000, \sqrt{15}, -\sqrt{5}$
Scientific notation	A number in the form $c \times 10^n$, where $1 \leq \lvert c \rvert < 10$ and n is an integer Used to represent numbers that are large or small in absolute value	3.12×10^4 -1.4521×10^{-2} 5×10^9 -3.98715×10^9 1.5987×10^{-6}
Percent change	If a quantity changes from c_1 to c_2, then the percent change equals $\frac{c_2 - c_1}{c_1} \times 100$.	If the price of a gallon of gasoline changes from \$1.00 to \$1.40, then the percent change is $\frac{1.4 - 1}{1} \times 100 = 40\%$.

Also discussed:

- Mean or average of a set of numbers.
- Absolute value |x|.
- Rules for exponents.

A particular type of example involving means that is often misinterpreted involves **"How to compute the mean of a set of mean values."** Do not add the set of means and divide by the number of means in the set. (WARNING: This idea appears in a number of situations.) Here is an example.

A company has a two groups of weekend workers. The first group has 5 workers whose mean salary is \$15,000 per year, while second group has 7 workers whose mean salary is \$22,000 per year. Determine the mean (average) salary of 12 workers.

Wrong way: compute the mean of the two means; that is, $\frac{15,000 + 22,000}{2} = \frac{37,000}{2} \approx 18,500$

Correct way: Find the total of all salaries and divide by 12; that is

$\frac{5(15,000) + 7(22,000)}{12} = \frac{229,000}{12} \approx 19,083.33$