

Real Numbers

Order of Operations:

1. **Parentheses** (in general, grouping symbols: $()$, $[\]$, $\sqrt{\quad}$, $|\quad|$, —)
2. **Exponents** (and roots and absolute values)
3. **Multiplication/division** (from left to right)
4. **Addition/subtraction** (from left to right)

ex: Evaluate $2(1 + 3(2 + 1)) + \sqrt{9 + 16}$.

ex: Evaluate $7 + 5(x - 4)^3$ for $x = 6$.

A letter used to represent various numbers is called a _____.

ex:

A letter used to represent a *particular* number is called a _____.

ex:

The combination of variables, constants, numbers, $+$, $-$, \cdot , \div , powers, roots, etc. is called an _____.

ex:

Two algebraic expressions with an equal sign in between is called an _____.

ex:

Absolute Value

The absolute value bars make the number inside positive.

ex: $|-4| =$

$|3| =$

$|0| =$

$|-π| =$

Adding

When adding same signs, we _____, and when adding opposite signs, we _____.

ex: $(-25) + (-13) =$

$(-25) + 13 =$

Addition Properties

1. $a + 0 = a$

2. $a + (-a) = 0$

Note: a and $-a$ are called _____.

ex: The additive inverse of -4 is _____.

ex: The additive inverse of 3 is _____.

ex: Find $-x$ if $x = -6$.

Subtracting

We can define subtraction in terms of addition: $a - b = a + (-b)$

ex: $6 - 13 =$

$5.1 - (-4.2) =$

Multiplying

When multiplying _____ signs, the result is _____.

When multiplying _____ signs, the result is _____.

ex:

$7(-3) =$

$(-4)(-2) =$

$(-5)^2 =$

$-5^2 =$

$\left(-\frac{2}{3}\right)^4 =$

Multiplication Properties

1. $a \cdot 0 = 0$

ex:

2. $a \cdot 1 = a$

ex:

Dividing

We can define division in terms of multiplication: $a \div b = a \cdot \frac{1}{b}$

Note: b and $\frac{1}{b}$ are _____ of each other (also called _____)

ex:

$$\text{ex: } -\frac{3}{4} \div \left(-\frac{9}{5}\right) =$$

Division Properties

1. $\frac{0}{a} = 0$ (if $a \neq 0$)

2. $\frac{a}{0}$ is _____

Order of Operations

ex: Evaluate.

$$4 - 7^2 + 8 \div 2(-3)^2 =$$

$$\frac{13 - 3(-2)^4}{3 - (6 - 10)} =$$

Inequalities

ex: True or false.

$$-3 > -2$$

$$-5 < 0$$

$$-1000000 < 4$$

$$-2 \geq -2$$

Practice

1. Evaluate:

a) $-\frac{3}{4} + \frac{1}{2}$ b) $-0.3 + 0.7$ c) $-\frac{11}{3} - \left(-\frac{4}{3}\right)$ d) $\frac{42}{0}$ e) $\frac{0}{-10}$ f) -6^2 g) $(-8)^2$
h) $\frac{12}{-3}$ i) $\sqrt{27} \cdot 0$ j) $\frac{17}{3} \cdot (-1)$ k) $\frac{16}{3} \div \frac{32}{9}$

2. Evaluate $4^2 - 8 \div |-6 + 4| \cdot (-2) + \sqrt{36 + 64}$ 3. Evaluate $\frac{-|14-3^2|^2}{3(-12)+11}$ 4. Evaluate $x^2 + 3x$ for $x = \frac{1}{3}$.5. Evaluate $x^2 - 4(x - y)$ for $x = -4$ and $y = 3$.6. True or false: $-|-5| < |-3|$