

1. Numbers:

(a) Integers

**Examples:**

(b) Rational Numbers

**Examples:**

(c) Irrational Numbers

**Examples:**

(d) Real Numbers

**Examples:**

2. Fractions:

**Example:** Find the sum of  $\frac{7}{5}$  and  $\frac{2}{15}$ .

**Example:** Find the product of  $\frac{5}{7}$  and  $\frac{4}{10}$ .

**Example:** What is  $\frac{6}{7}$  divided by  $\frac{7}{3}$ ?

**Example:** Convert .24 to a fraction.

3. Arithmetic operations on the real numbers

The following is a list of things which is *always* true:

$$a + b = \underline{\hspace{2cm}} \quad (1)$$

$$a \cdot b = \underline{\hspace{2cm}} \quad (2)$$

$$a(b + c) = \underline{\hspace{2cm}} \quad (3)$$

$$(b + c)a = \underline{\hspace{2cm}}. \quad (4)$$

**Example:** Simplify the expression  $2.3x + 5.1x$ .

**Example:** Simplify the expression  $21(\frac{7+x}{7})$ .

#### 4. Rules for exponents

(a)  $a^0 = \underline{\hspace{2cm}}$  (if  $a$  is a nonzero real number).

**Examples:**

- $1^0$
- $x^0$

(b)  $a^b a^c = \underline{\hspace{2cm}}$ .

**Examples:**

- $3 \times 3^2$
- $5^\pi (5^2)$
- $6 \times 6^{-1}$
- $4^{\frac{1}{2}} \times 4^{\frac{1}{2}}$
- $8^{\frac{1}{3}} (8^{\frac{1}{3}}) (8^{\frac{1}{3}})$

(c)  $(ab)^c = \underline{\hspace{2cm}}$ .

**Examples:**

- $(2 \times 5)^2$
- $(xy)^7$
- $\left(\frac{4}{9}\right)^{\frac{1}{2}}$

(d)  $(a^b)^c = \underline{\hspace{2cm}}$ .

**Examples:**

- $(5)^2$
- $(8^{\frac{1}{3}})^4$
- $(\pi^2 x^4)^5$

5. As a consequence of (b), we have that  $a^{-b} = \underline{\hspace{2cm}}$  and  $\frac{1}{a^{-b}} = \underline{\hspace{2cm}}$ .

**Examples:**

- $\left(\frac{1}{x}\right)^{-3}$
- $\frac{x^{-3}}{x^{-4}}$
- $\frac{a^5 b^{-4}}{(a^{-3} b^2)^2} (ab^{-3})^2$