

King Fahd University of Petroleum and Minerals  
 Prep-Year Math Program  
 Math 001 - Term 181

**Reading Mathematical Expressions & Arithmetic Operations**

Expression	Reads	Note
$x \in A$	$x$ belongs to $A$ <b>or</b> $x$ is in $A$	Between an element and a set.
$A \subset B$	$A$ is a subset of $B$	Between two sets.
$\phi$	The empty set	$\emptyset \neq \{\emptyset\}$
$A \cup B$	$A$ union $B$	
$A \cap B$	$A$ intersection $B$	
$A'$	The complement of $A$	
$a + b = c$	$a$ plus $b$ is equal to $c$	Addition; $c$ is the sum
$a - b = c$	$a$ minus $b$ equals $c$	Subtraction; $c$ is the difference
$a \cdot b = c$	$a$ times $b$ is equal to $c$	Multiplication; $c$ is the product
$a \div b = c$	$a$ divided by $b$ equals $c$	Division; $c$ is the quotient
$\frac{a}{b}, a/b$	$a$ over $b$ <b>or</b> $a$ by $b$	Fraction $a$ : numerator $b$ : denominator
$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$	one half, one third, one fourth	(Reciprocals of 2, 3 and 4)
$\frac{5}{2}, \frac{2}{3}, \frac{7}{10}$	five halves, two thirds , seven tenths	
$a^b$	$a$ to the $b$ , $a$ to the $b^{\text{th}}$ Power	$a$ : base, $b$ : exponent
$a^2, a^3, a^{-1}$	$a$ squared, $a$ cubed, $a$ inverse	
$\sqrt[n]{a}$	The $n^{\text{th}}$ root of $a$	$n^{\text{th}}$ radical, $a$ - radicand, $n$ -index
$\sqrt{a}, \sqrt[3]{a}$	Square root of $a$ , cube root of $a$	
$a < b$	$a$ is less than $b$	Inequalities
$a \leq b$	$a$ is less than or equal to $b$	
$a > b$	$a$ is greater than $b$	
$a \geq b$	$a$ is greater than or equal to $b$	

**Question 1:** Given:  $x = \frac{1}{9}$ ,  $y = -5$  and  $w = -\frac{5}{7}$ . Find:

- a)  $x + y =$
- b)  $\frac{x}{y} =$
- c)  $2x^2 =$
- d)  $\frac{x+w}{w-x} =$
- e)  $7\frac{1}{5} - 4\frac{1}{8} \div 1\frac{1}{4} =$

**Answer:**

a)  $x + y = \frac{-44}{9}$     b)  $\frac{x}{y} = -\frac{1}{45}$     c)  $2x^2 = \frac{2}{81}$     d)  $\frac{x+w}{w-x} = \frac{19}{26}$     e)  $7\frac{1}{5} - 4\frac{1}{8} \div 1\frac{1}{4} = \frac{39}{10}$

**Question 2:** Find:

(a): $1.32 + 0.132 =$
(b): $1.05 - 100.3 =$
(c): $26.06 \div 25 =$
(d): $1.5 \div 0.15 =$
(e): $\frac{1.2 \times 1.04}{0.06} =$

**Solution:**

(a):  $1.32 + 0.132 = 1.320 + 0.132 = 1.452$

(b):  $1.05 - 100.3 = -100.30 + 1.05 = -99.25$

(c):  $26.06 \div 25 = \frac{26.06}{25} = \frac{26.06 \times 4}{25 \times 4} = \frac{104.24}{100} = 1.0424$

OR:  $26.06 \div 25 = \frac{26.06}{25} = \frac{26.06 \times 100}{25 \times 100} = \frac{2606}{2500} = 1.0424$

(d):  $1.5 \div 0.15 = \frac{1.5}{0.15} = \frac{1.50}{0.15} = \frac{150}{15} = \frac{10}{1} = 10$

(e):  $\frac{1.2 \times 1.04}{0.06} = \frac{100 \times 1.2 \times 1.04}{100 \times 0.06} = \frac{120 \times 1.04}{6} = 20 \times 1.04 = 2 \times 10.4 = 20.8$

**Question 3:** Answer the following:

1. Which is larger  $\pi$  or  $\frac{22}{7}$ ? Why? ( $\pi \approx 3.14159$ )

Answer:  $\frac{22}{7}$  because  $\frac{22}{7} = 3.\overline{142857}$

2. Which is smaller  $\frac{3}{5}$  or  $\frac{1}{2}$ ? Why?

Answer:  $\frac{1}{2}$  because  $\frac{3}{5} = \frac{3(2)}{5(2)} = \frac{6}{10}$  and  $\frac{1}{2} = \frac{1(5)}{2(5)} = \frac{5}{10}$

3. Express  $\frac{1}{3}$  in decimal form.

Answer:  $\frac{1}{3} = 0.3333\cdots = 0.\overline{3}$

$$\begin{array}{r} 0.33 \\ 3 \overline{) 10} \\ \underline{9} \\ 10 \end{array}$$

4. Express  $0.\overline{4}$  as a fraction.

Let  $x = 0.\overline{4} = 0.4444\dots$  which is a rational number.

To convert it to a ratio of two integers, we write:

$$10x = 10(0.444\dots) = 4.444\dots$$

$$\underline{\hspace{10em} x = 0.444\dots}$$

$$9x = 4$$

$$x = \frac{4}{9}$$

**Another Example:**

Express  $x = 2.\overline{5797979}\dots$  as a fraction

Solution:  $1000x = 1000(2.\overline{5797979}\dots)$

$$1000x = 2579.\overline{7979}\dots$$

$$\underline{\hspace{10em} 10x = 25.\overline{7979}\dots}$$

$$990x = 2554$$

$$x = \frac{2554}{990}$$

$$x = \frac{1277}{495}$$

5. Express 0.62 as a fraction in its lowest terms.

**Answer:**  $0.62 = \frac{31}{50}$  because  $0.62 = \frac{0.62}{1} = \frac{62}{100} = \frac{2(31)}{2(50)} = \frac{31}{50}$

6. Find the reciprocal of the mixed number  $-2\frac{3}{5}$

**Answer:**  $-\frac{5}{13}$  because  $-2\frac{3}{5} = -\left(2\frac{3}{5}\right) = -\left(2 + \frac{3}{5}\right) = -\frac{13}{5}$

7. Find (a):  $\sqrt{196} =$  (b):  $\sqrt{30.25}$  (c):  $\sqrt{0.25 - 0.16}$

**Solution:** (a):  $\sqrt{196} = \sqrt{14^2} = 14$

Or  $\sqrt{1521} = \sqrt{(3)^2(13)^2} = 3(13) = 39$

(b):  $\sqrt{30.25} = \sqrt{\frac{3025}{100}} = \sqrt{\frac{55^2}{10^2}} = \sqrt{\left(\frac{55}{10}\right)^2} = \frac{55}{10} = 5.5$

(c):  $\sqrt{0.25 - 0.16} = \sqrt{0.09} = \sqrt{(0.3)^2} = 0.3$

**OR:**  $\sqrt{0.25 - 0.16} = \sqrt{\frac{25}{100} - \frac{16}{100}} = \sqrt{\frac{9}{100}} = \frac{3}{10} = 0.3$

**OR:**  $\sqrt{0.25 - 0.16} = \sqrt{0.09} = \sqrt{\frac{9}{100}} = \frac{3}{10} = 0.3$

**Answer:** (a):  $\sqrt{1521} = 39$

(b):  $\sqrt{30.25} = 5.5$

(c):  $\sqrt{0.25 - 0.16} = 0.3$

3	1521
3	507
13	169
13	13