

Review of equations:

Equation is an equality with one or more variables. DO NOT FORGET TO CHECK YOUR ANSWER

$$2 + 4x = 10$$

$$y^2 = 9$$

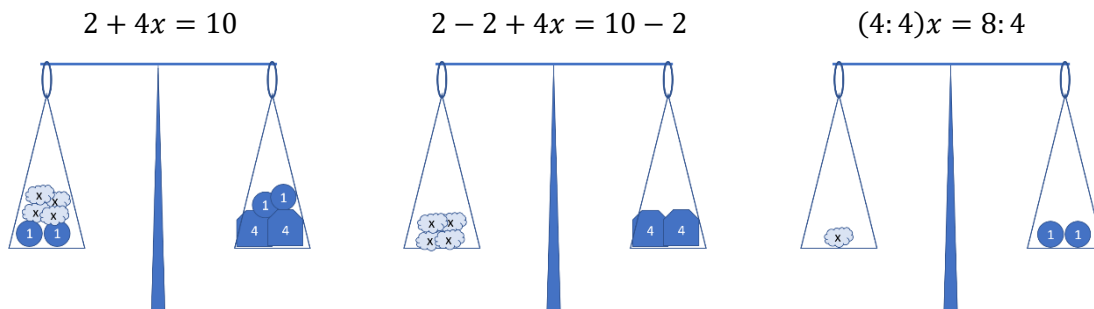
$$x + y + z = 100$$

$$|x| = 10$$

$$z \cdot y = 1$$

$$|x| = -10$$

We can add and subtract the same quantity to (or from) both sides of an equation, the balance will be in place. Also, we can multiply and divide both side by the same amount, keeping the balance.



$$\begin{aligned}
 2 + 4x &= 10 \\
 4x &= 10 - 2 = 8 \\
 x &= 8:4 = 2
 \end{aligned}$$

$$\begin{aligned}
 3x + 4 &= 13 \\
 3x &= 13 - 4 = 9 \\
 x &= 9:3 = 3
 \end{aligned}$$

$$|x| + 5 = 10$$

- There are 27 pencils in two boxes altogether. There are 5 more pencils in one box than in the other. How many pencils are there in each box?
- There are candies in a box. If each kid will take 4 candies, 19 candies will be left in the box. If each kid will take 5 candies, there will be 2 candies short. How many candies are there in the box?
- There were 624 books in two boxes altogether. When $\frac{1}{3}$ of the books from one box and $\frac{3}{7}$ of the books from another box were sold to the customers, the number of books in each box became equal. How many books were there in each box at the beginning?
- On the lawn grew 35 yellow and white dandelions. After eight whites flew away, and two yellows turned white, there were twice as many yellow dandelions as white ones. How many whites and how many yellow dandelions grew on the lawn at the beginning?

DISTANCE- SPEED- TIME

A man travels at 4 mph in still water. If the current's velocity is 2 mph, it takes 4 hours to row to a place and come back. How far is the place?

If a person walks at 4 mph, he covers a certain distance. If he walks at 9 mph, he covers 7.5 miles more. How much distance did he cover?

A swimming pool can be filled by one pipe in 3 hours, by another pipe in 5 hours and by a third pipe in 10 hours. How long it will take to fill up the pool if all three pipes are working?

Review of operations with fractions:

Fraction addition: $\frac{5}{12} + \frac{2}{15} = \frac{5 \cdot 5}{60} + \frac{2 \cdot 4}{60} = \frac{25+8}{60} = \frac{33}{60} = \frac{33}{60} \cdot \frac{3}{3} = \frac{11}{20}$

1. Find common denominator, which is LCM.
2. Add, simplify if needed.

Fraction subtraction: $3\frac{2}{15} - \frac{5}{12} = 3\frac{2 \cdot 4}{60} - \frac{5 \cdot 5}{60} = 3\frac{8}{60} - \frac{25}{60} = 2\frac{68}{60} - \frac{25}{60} = 2\frac{43}{60}$

1. Find common denominator, which is LCM.
2. Borrow 1 if needed,
3. Subtract, simplify if needed.

Compute: (Remember the common denominator is LCM, borrow 1 from the wholes if needed, DO NOT convert the entire whole number into a fraction.)

(a) $4\frac{5}{12} - \frac{8}{9} =$

(b) $1\frac{1}{30} + \frac{5}{24} =$

Fraction multiplication: $\frac{3}{4} \cdot \frac{2}{3} =$

1. Multiply numerators and denominators: $\frac{3}{4} \cdot \frac{2}{3} = \frac{3 \cdot 2}{4 \cdot 3}$

2. Simplify by using number prime factorization: $\frac{3}{4} \cdot \frac{2}{3} = \frac{3 \cdot 2}{4 \cdot 3} = \frac{3 \cdot 2}{2 \cdot 2 \cdot 3} = \frac{1}{2}$

Fraction division: $\frac{1}{2} \div \frac{2}{3} = \frac{1}{2} \cdot \frac{3}{2} = \frac{1 \cdot 3}{2 \cdot 2} = \frac{3}{4}$

1. Find a **reciprocal (inverse)** of the divisor. **Reciprocal** of $\frac{2}{3}$ is $\frac{3}{2}$.
2. Turn division into multiplication and simplify by using prime factorization:

Compute: (*First make all fractions irregular; then multiply*)

$$(a) \frac{9}{16} \cdot \frac{4}{45} =$$

$$(b) 3\frac{3}{7} \cdot \frac{7}{24} =$$

Compute: (*First make all fractions irregular; then divide*)

$$(a) 1\frac{1}{4} \div 2\frac{1}{2} =$$

$$(b) \frac{4}{13} \div \frac{11}{13} =$$

Exponents review:

$$b^n \times b^m = b^{n+m}$$

$$(b^2)^3 = (b \cdot b)^3 = (b \cdot b) \cdot (b \cdot b) \cdot (b \cdot b) = b^{2 \cdot 3} = b^6$$

$$(b^n)^m = b^{n \cdot m}$$

$$(a \cdot b)^3 = (a \cdot b) \cdot (a \cdot b) \cdot (a \cdot b) = a \cdot a \cdot a \cdot b \cdot b \cdot b = a^3 b^3$$

$$(a \cdot b)^n = a^n b^n$$

$$a^{-n} = \frac{1}{a^n}$$

Simplify:

$$\frac{x^5 \cdot x^8}{x^{-3}} =$$

$$\frac{2^3 \cdot 3^2 \cdot 6^8}{2^{10} \cdot 3^6} =$$

$$\frac{y^n \cdot y^{n+2}}{y^{2n}} =$$

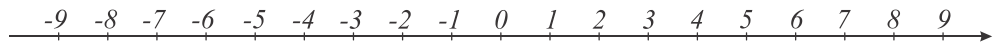
$$\frac{y^{n+12}}{y^n \cdot y^{11}} =$$

$$\frac{m^{n+12}}{m^n} =$$

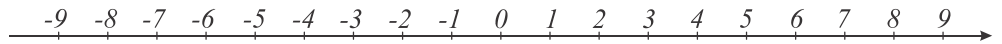
$$\frac{4b - ab}{b} =$$

Show on the number line points that are satisfying the following inequalities:

a) $|x| < 2.5$



b) $\left|x - \frac{1}{4}\right| > 5$



d) $|8x - 8| \geq 24$



There are three bags of balls containing identical colors: one has red, the other has green, and the third bag has blue balls. If you take out 75 balls from one of the bags, 46 from the other, and 52 from the third, there is an equal number of balls in each bag. How many balls were in each bag at the beginning if we started with a total of 533 balls?

ORDER OF OPERATIONS!!!!!!!

1	2	3	4	5	6
P	E	M	D	A	S
Parentheses	Exponents	Multiplication	Division	Addition	Subtraction
(....)	a^2	X	÷	+	-

$$\frac{0.4 + 8 \cdot \left(5 - 0.8 \cdot \frac{5}{8}\right) - 5 \div 2 \frac{1}{2}}{\left(1 \frac{7}{8} \cdot 8 - \left(8.9 - 2.6 \div \frac{2}{3}\right)\right) 34 \frac{2}{5}} \cdot 90 =$$

Simplify the following expressions:

a) $-(m - a) - (k + a) =$

b) $m + (k - a - m) =$

c) $m - (a + m) - (-a - m) =$

d) $a - (a - b)$

Simplify the following expressions:

a) $2a + 3(a + b) - 3b - (-7ab + 5a + 9ab) =$

b) $5(m - 3n) + 14n =$

Geometry: triangle, square, rectangle, trapezoid - perimeter, area

Find the expression that will give you:

a) the perimeter of the figure below

b) the area of the figure below

