



1. Solve the following equations:

a. $86 + x = 123$

b. $128 - m = 54$

c. $z - 35 = 43$

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2. A 3-digit number **A2B** is divisible by 3 and by 5. Find the number.

3. Is the number 12345 divisible by 3? by 9? by 5? by 10?

4. Without calculating the sum, can you tell if $222 + 222222$ is divisible by 2?
3? 5? 10?

Algebra. Fractions.

A fraction (from Latin: fractus, "broken") is a part of a whole.

Slice a pizza, and we get fractions:



$\frac{1}{2}$

(One-Half)



$\frac{1}{4}$

(One-Quarter)



$\frac{3}{8}$

(Three-Eighths)

The top number says how many slices we **have**.

The bottom number says how many equal slices the whole pizza was **cut into**

Look at the picture on the right:

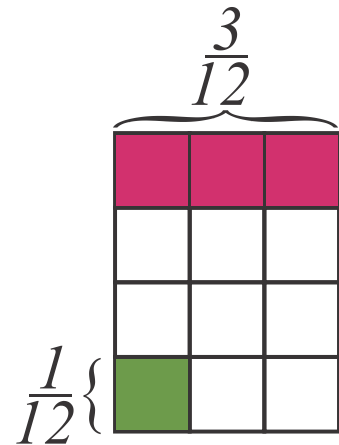
A chocolate bar is divided into 12 equal pieces

Each piece then would be:

1 (*whole chocolate bar*) \div 12 (*equal parts*)

$$= \frac{1 \text{ (whole chocolate bar)}}{12 \text{ (equal parts)}}$$

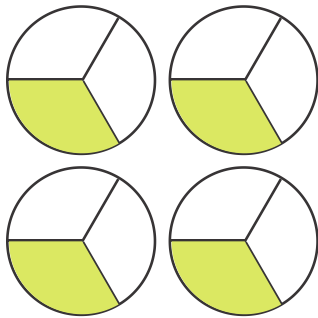
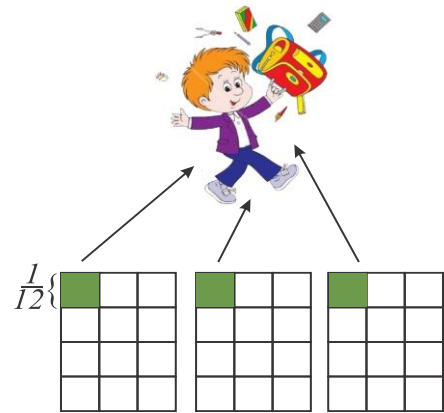
$$= \frac{1}{12} \text{ (of whole chocolate bar)}$$



$$\frac{1}{12} + \frac{1}{12} + \frac{1}{12} = 3 \times \frac{1}{12} = \frac{3}{12} = \frac{1}{4} = 3 \div 12$$

To divide 3 chocolate bars between 12 kids we can give each kid $\frac{1}{12}$ of each chocolate bar and that will add up to $\frac{3}{12}$

$$3 \div 12 = 3 \times \frac{1}{12} = \frac{3}{12} = \frac{1}{4}$$



To divide 4 pizzas equally between 3 friends we will give each friend $\frac{1}{3}$ of each pizza.

Each friend will get $4 \div 3 = 4 \times \frac{1}{3} = \frac{4}{3}$ which is exactly 1 whole pizza ($3 \times \frac{1}{3} = \frac{3}{3} = 1$) and $\frac{1}{3}$.

Mark following fractions on the number line:

$$\frac{1}{5}, \quad \frac{3}{5}, \quad \frac{3}{3}, \quad \frac{7}{5}, \quad \frac{10}{5}$$



Sometimes we want to find a part of something which is not 1, but can be considered as a single object. For example, $\frac{2}{5}$ of my 30 pencils are yellow. How many yellow pencils do I have? What does it mean to find $\frac{2}{5}$ out of 30? All 30 of these pencils is a single object. We want to calculate how many pencils does a little pile of $\frac{2}{5}$ of 30 contain?



1. First, we find how many pencils will be in $\frac{1}{5}$

$$30 \times \frac{1}{5} = \frac{30}{5} = 30 \div 5$$

2. Then, we find $\frac{2}{5}$ of 30 pencils, which will be twice more

$$30 \times \frac{1}{5} \times 2 = 30 \times \frac{2}{5} = 30 \div 5 \times 2$$

Exercises.

1. Rewrite these expression of division as fractions:

Example: $3 \div 5 = \frac{3}{5}$

$9 \div 5 =$

$5 \div 11 =$

$2 \div 6 =$

2. Compare:

$\frac{3}{5} \quad \frac{2}{5}$

$\frac{3}{5} \quad \frac{3}{8}$

$\frac{3}{6} \quad \frac{1}{2}$

$\frac{1}{5} \quad \frac{5}{1}$

$\frac{4}{12} \quad \frac{3}{4}$

$\frac{2}{11} \quad \frac{1}{12}$

3. Calculate:

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} =$$

$$\frac{2}{7} + \frac{1}{7} =$$

$$\frac{7}{9} - \frac{3}{9} =$$

4. In the school cafeteria, there are 12 tables. There are 10 seats at each table. At lunch time $\frac{4}{5}$ of all seats were occupied by students. How many students were in the cafeteria during the lunch?

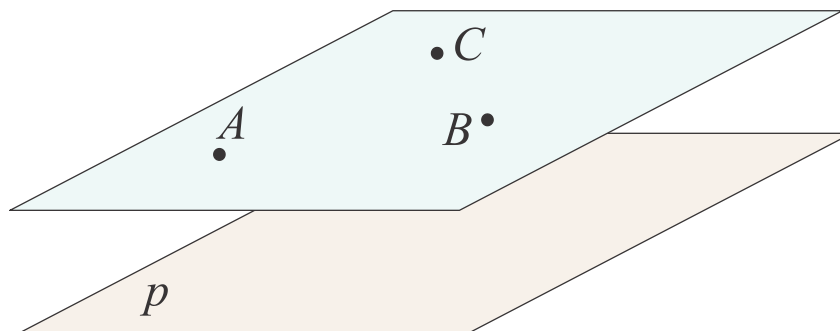
5. Write an equation for the following problems:

- a. 3 packages of cookies cost a dollars. How many dollars do 5 of the same packages cost?
- b. 5 bottles of juice cost b dollars. How many bottles can one buy with c dollars?

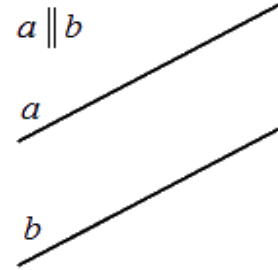
Geometry.

Plane is a flat level or surface.

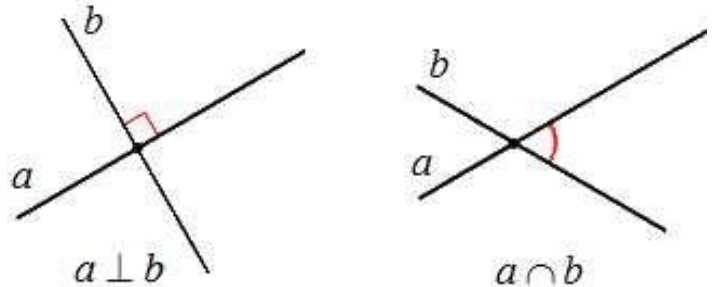
- A plane has no thickness but extends indefinitely in all directions.
- Planes are usually represented by parallelogram.
- Even though the diagram of a plane has edges, you must remember that the plane has no boundaries.
- A plane is named by a single letter (plane p) or by three non-collinear points (plane ABC).



Parallel lines are lines in a plane which do not meet; that is, two lines in a plane that do not intersect or touch each other at any point are said to be parallel.

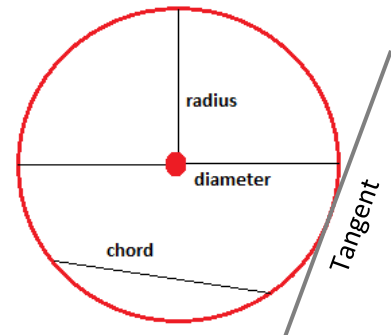


Two straight lines can intersect (then they have one common point).



Circle is the set of all points on a plane that are a fixed distance from a center.

The circle is a plane shape (two dimensional)



1. Michel drew three lines, none of them are parallel:
 - a. marked 2 points on each of the three lines. He marked 3 points altogether. How can this be?
 - b. marked 2 points on each of three lines. He marked 4 points altogether. How can this be?
2. Two circles touch at a single point (tangent circles). The radius of the first circle is 10 cm, the radius of the second circle is 6 cm. What is the distance between the centers of these circles?