Math 4a. Class work 14.

Algebra.

$$\begin{array}{r} {\scriptstyle 1} \\ \times\ 231 \\ 34 \\ \hline {\scriptstyle 1}924 \\ +\ 693 \\ \hline 7854 \end{array}$$

$$\begin{aligned} 231 \cdot 34 = 231 \cdot (30 + 4) &= 231 \cdot 4 + 231 \cdot 30 \\ &= (200 + 30 + 1) \cdot 4 + (200 + 30 + 1)30 \\ &= 4 + 10 \cdot 3 \cdot 4 + 100 \cdot 2 \cdot 4 + 10 \cdot 3 + 10 \cdot 10 \cdot 3 \cdot 3 + 100 \cdot 2 \cdot 10 \cdot 3 \\ &= 4 + 10 \cdot 12 + 100 \cdot 8 + 10 \cdot 3 + 100 \cdot 9 + 1000 \cdot 6 \\ &= 4 + 10 \cdot 2 + 100 + 100 \cdot 8 + 10 \cdot 3 + 100 \cdot 9 + 1000 \cdot 6 \\ &= 4 + 10 \cdot 2 + 100 \cdot 9 + 10 \cdot 3 + 100 \cdot 9 + 1000 \cdot 6 \\ &= 4 + 10 \cdot 5 + 100 \cdot 8 + 1000 + 1000 \cdot 6 = 4 + 50 + 800 + 7000 \\ &= 7854 \end{aligned}$$

1. $\dfrac{(7-6.35)\div 6.5+9.9}{\left(1.2\div 36+1.2\div 0.25-1\frac{5}{16}\right)\div\frac{169}{24}} =$

2.

$$\left(\left(\frac{7}{9}-\frac{47}{72}\right)\div 1.25+\left(\frac{6}{7}-\frac{17}{28}\right)\div(0.358-0.108)\right)\cdot 1.6-\frac{19}{25};$$

Ratio and percent.

There are two ways to compare natural numbers. We can subtract the larger number from the smaller one and we can divide one number by another. In the former case, we will find how much the first number is bigger than the second number and in the latter case we will know what part of the second number the first number is (or how many times the first number contains the second). For example: in a fourth grade, there are 80 boys and 100 girls. So, there are 20 more girls than boys ($100 - 80 = 20$), and the number of boys is $\frac{4}{5}$ of the number of girls ($80 \div 100 = \frac{80}{100} = \frac{4}{5}$), number of boys (80) contains number of girls (100) $\frac{4}{5}$ times. When we compare things using the division we also use the word *ratio*.

> The ratio of two numbers indicates how many times one number is larger than another or which part of one number the other number is.

We can write the ratio of two numbers in the several ways:

$$a \text{ to } b, \qquad a : b, \qquad \frac{a}{b}$$

Example: To make pancakes we use 3 cups of flour and 2 cups of milk.

So the ratio of flour to milk is **3 : 2,** which means that for each 2 cups of milk we need to have 3 cups of flour. To make pancakes for a LOT of people we might need 4 times the quantity, so we multiply the numbers by 4:

$$(3 \cdot 4) : (2 \cdot 4) \; = \; 12 : 8 \qquad \left(\frac{3 \cdot 4}{2 \cdot 4} = \frac{12}{8}\right)$$

In other words, 12 cups of flour and 8 cups of milk.

The ratio is still the same, so the pancakes should be just as yummy.

1 percent of quantity is a $\frac{1}{100}$ th part of it.

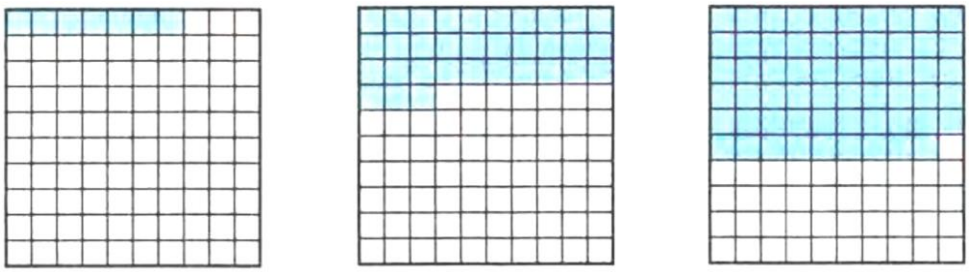
1. One percent (**1%**) means 1 per 100.

1% of this line is shaded green: it is very small isn't it?

2. How many squares we have to shade to shade 10% of the line, 15%, 20%, 25%?

3. In a department store, there is a sale of 25% off on everything. How much does the dress cost if its price before sale was $80? How much this dress will cost if an additional sale of 30% of will be applied?

4. What percent of each square is shaded on the picture below?



Geometry.

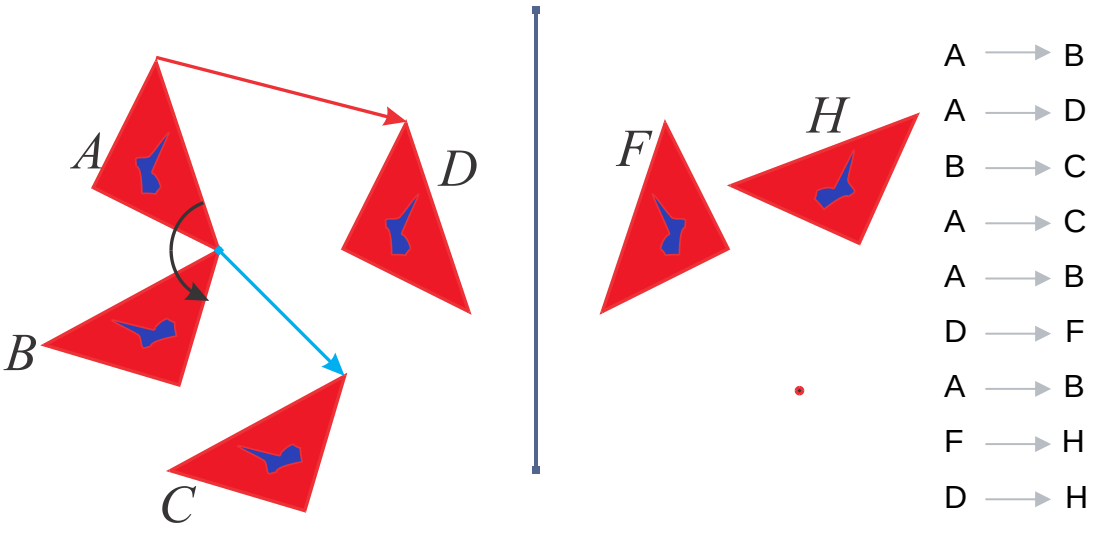
Rigid Motion:

Any way of moving all the points in the plane such that

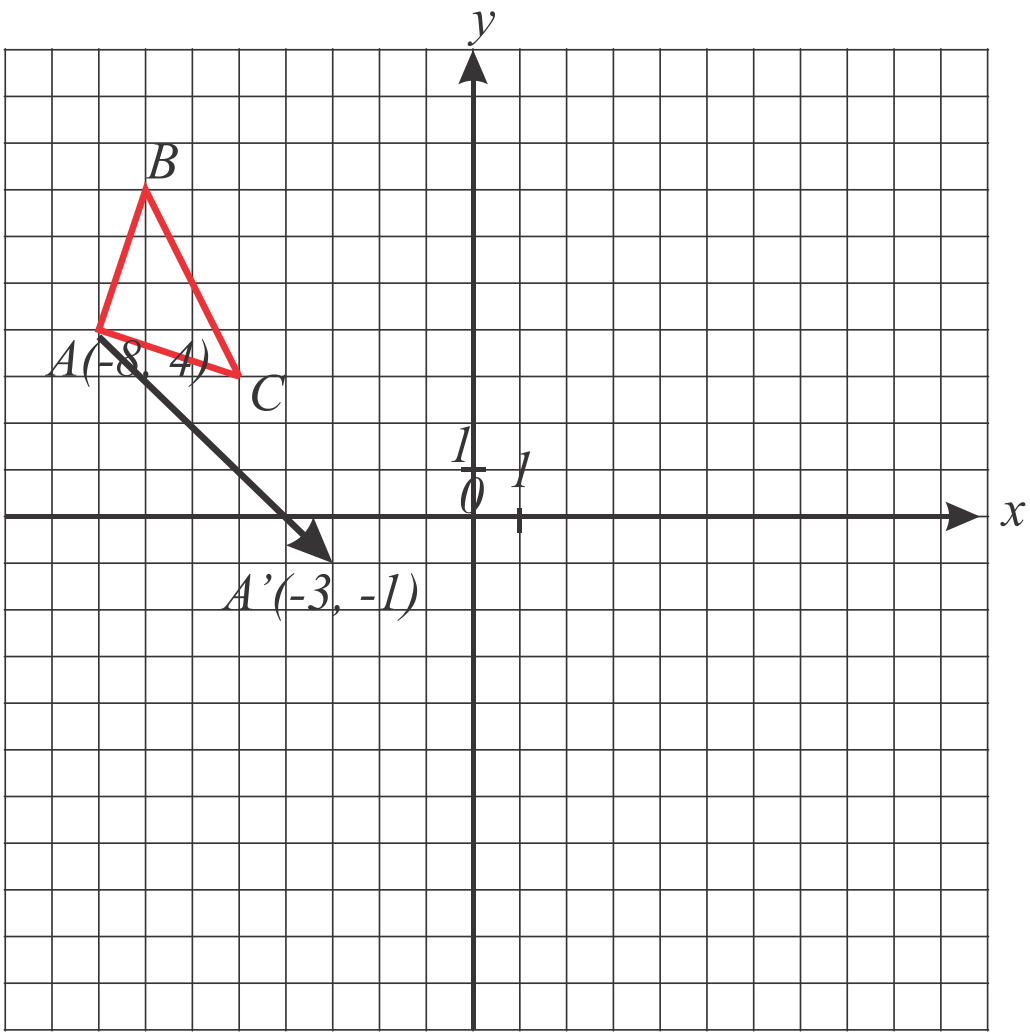
a) the relative distance between points stays the same and

b) the relative position of the points stays the same.

There are four types of rigid motions that we will consider: translation , rotation, reflection, and glide reflection.



A → B
A → D
B → C
A → C
A → B
D → F
A → B
F → H
D → H



1. Solve the following equations:

$\frac{1}{3}y + 2 = 1;$

$\frac{1}{5}x + 11 = 1 - \frac{3}{5}x;$

$8 - \frac{1}{4}z = 1;$

$3 - \frac{5}{7}t = 1 - \frac{3}{7}t;$

$\frac{1}{8}u - 2 = \frac{5}{8}u + 1;$

$\frac{2}{5}z - 7 = 3.$