Math 4b. **Fractions multiplication**

Multiplication of fraction by a number.

To multiply fraction by a number we need to multiply the numerator by a number:

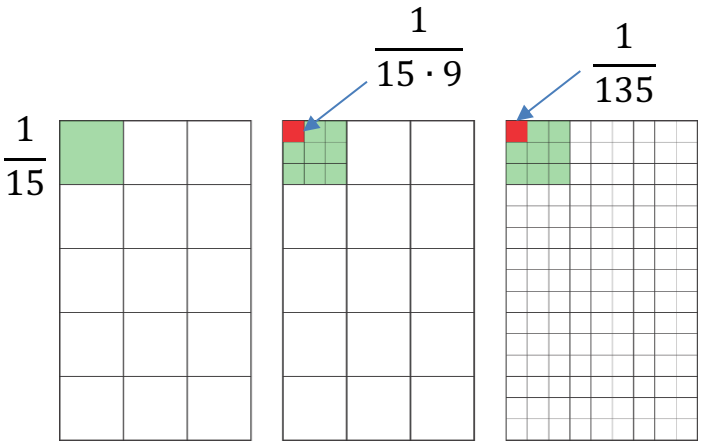
$$\frac{2}{7}\cdot 3=\frac{2}{7}+\frac{2}{7}+\frac{2}{7}=\frac{2+2+2}{7}=\frac{3\cdot 2}{7}=\frac{6}{7}=6:7$$

Multiplication of a fraction by a fraction.

$\frac{1}{15}$ is a part of a whole divided into 15 equal small parts.

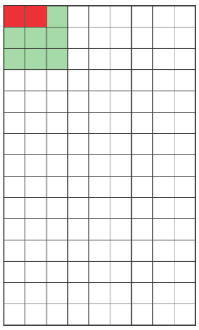
If we want to take $\frac{1}{9}$ part of this little $\frac{1}{15}$ chunk we have to divide it into 9 even smaller pieces, to find $\frac{1}{9}^{\text{th}}$ of $\frac{1}{15}^{\text{th}}$.

$$\frac{1}{15}:9=\frac{1}{15}\cdot\frac{1}{9}=\frac{1}{15\cdot 9}=\frac{1}{135}$$



If we need to take two small $\frac{1}{9}$ of $\frac{1}{15}$

$$\frac{1}{15}:9\cdot 2=\frac{1}{15}\cdot\frac{2}{9}=\frac{1\cdot 2}{15\cdot 9}=\frac{2}{135}$$



To multiply two fractions, we need to multiply numerators, multiply denominators and reduce fraction, if possible.

Example:

$$\frac{3}{8}\cdot\frac{2}{3}=\frac{3\cdot 2}{8\cdot 3}=\frac{6}{24}$$

Can we reduce the fraction $\frac{6}{24}$?

$$\frac{6}{24} = \frac{1}{4}$$

So putting all together,

$$\frac{3}{8} \cdot \frac{2}{3} = \frac{3 \cdot 2}{8 \cdot 3} = \frac{6}{24} = \frac{1}{4}$$

We could have also did it differently and reduce fraction on the go:

$$\frac{3}{8} \cdot \frac{2}{3} = \frac{3 \cdot 2}{8 \cdot 3} = \frac{3 \cdot 2}{4 \cdot 2 \cdot 3} = \frac{3}{4 \cdot 3} = \frac{1}{4}$$

Let's solve a problem with fractions:

Father is 42 years old. The son's age is $\frac{2}{7}$ of his father. How old is the son?

$42 : 7 = 6$ One seventh of the age of father is 6,

$6 \cdot 2 = 12$, two sevenths is 12, son is 12 years old.

$$42 : 7 \cdot 2 = 42 \cdot \frac{1}{7} \cdot 2 = \frac{2}{7} \cdot 42 = 12$$

To find a part of a number, we need to multiply the part $\left(\frac{2}{7}\right)$ by a number (42).

Homework

1. Calculate:

$a)\ \frac{3}{7}\cdot 2$ b) $3\cdot\frac{1}{6}$ c) $9\cdot\frac{5}{6}$ d) $\frac{1}{2}\cdot\frac{5}{6}$ e) $\frac{4}{3}\cdot\frac{5}{8}$

2. There are 100 fourth graders in an elementary school. 3/4 of them went to the field trip. How many students went to the field trip?

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

4. Calculate:

$$\frac{14}{15}\cdot\frac{10}{49}+\frac{3}{7}$$

5. There are 100 fourth graders in an SchoolNova school. 20 students took part in a math competition. What fraction of the students participated in the math competition?

6. Evaluate:

$a)\ \frac{3}{3}\cdot\frac{5}{7}$ $b)\ \frac{1}{4}\cdot\frac{1}{2}$ $c)\ \frac{4}{3}\cdot\frac{1}{2}$ $d)\ \frac{4}{9}\cdot\frac{9}{8}$

$e)\ \frac{3}{5}\cdot\frac{1}{2}\cdot\frac{4}{9}$

7. Cut each square on a picture below into 4 **equal** parts, so that each part will have one “X”.

	X	X	
	X	X	

X			
	X		
		X	
			X

		X	
X	X	X	

8.