

Lesson 6 – Dividing Fractions and Integers

Starter

1) $\frac{2}{3} \times \frac{4}{5}$

2) $3\frac{1}{2} \times 1\frac{1}{3}$

3) $4 \times \frac{2}{7}$

4) $\frac{3}{4} \times 8$

Starter Answers

1) $\frac{8}{15}$

2) $\frac{14}{3}$

3) $\frac{8}{7}$

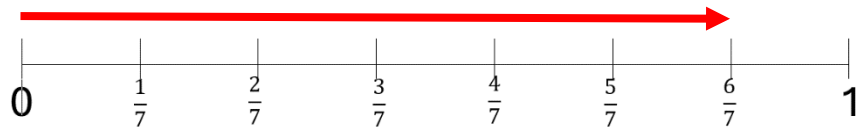
4) 6

In this lesson, we will look at how to **divide fractions by integers** and vice versa.

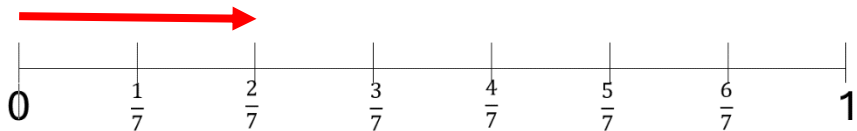
First, let's look at what happens when we divide a **fraction** by an **integer**.

We can think of $\frac{6}{7}$ as being a distance of $\frac{6}{7}$ from zero.

$$\frac{6}{7} \div 3$$



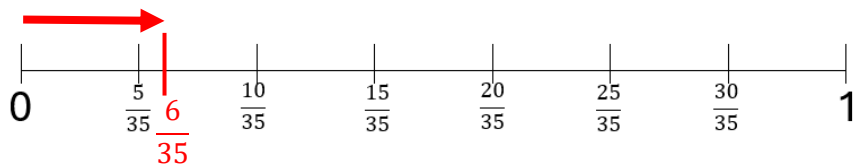
When we divide this by 3, we are dividing the distance from zero by 3.



So, $\frac{6}{7} \div 3 = \frac{2}{7}$

Now let's look at $\frac{6}{7} \div 5$. If we used the number line above, we can't easily split $\frac{6}{7}$ into

5. So, we will change $\frac{6}{7}$ into $\frac{30}{35}$ since 30 can be split into 5 parts easily.



Now let's look at our two answers:

$$\frac{6}{7} \div 3 = \frac{6}{21} \leftarrow \text{We got } \frac{2}{7} \text{ but } \frac{2}{7} = \frac{6}{21}$$

$$\frac{6}{7} \div 5 = \frac{6}{35}$$

We can see that when we divide by an integer, we are actually **multiplying the denominator**.

So, $\div 3$ is like $\times \frac{1}{3}$ and $\div 5$ is like $\times \frac{1}{5}$

Examples

$$1) \frac{4}{5} \div 2 = \frac{4}{5} \times \frac{1}{2} = \frac{4}{10} = \frac{2}{5}$$

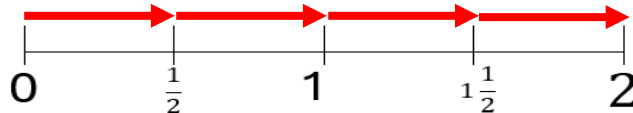
$$2) \frac{5}{6} \div 8 = \frac{5}{6} \times \frac{1}{8} = \frac{5}{48}$$

$$3) \frac{7}{10} \div 18 = \frac{7}{10} \times \frac{1}{18} = \frac{7}{180}$$

$$4) \frac{3}{4} \div 70 = \frac{3}{4} \times \frac{1}{70} = \frac{3}{280}$$

Now, let's look at what happens when we divide an **integer** by a **fraction**.

$$2 \div \frac{1}{2}$$

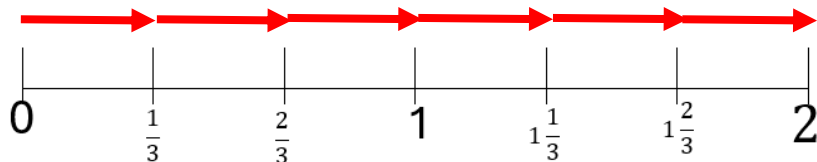


This calculation is the same as saying "how many $\frac{1}{2}$'s fit into 2?".

We can see from the number line that there are in fact **four** $\frac{1}{2}$'s in 2.

$$\text{So, } 2 \div \frac{1}{2} = 4$$

$$2 \div \frac{1}{3}$$



This calculation is the same as saying "how many $\frac{1}{3}$'s fit into 2?".

We can see from the number line that there are **six** $\frac{1}{3}$'s in 2.

$$\text{So, } 2 \div \frac{1}{3} = 6$$

So, let's look at our two calculations.

$$2 \div \frac{1}{2} = 4 \quad \text{dividing by } \frac{1}{2} \text{ is the same as multiplying by } 2$$

$$2 \div \frac{1}{3} = 6 \quad \text{dividing by } \frac{1}{3} \text{ is the same as multiplying by } 3$$

So, $\div \frac{1}{2}$ is like $\times \frac{2}{1}$ and $\div \frac{1}{3}$ is like $\times \frac{3}{1}$

We are **multiplying** by the **reciprocal**. To find the reciprocal of any fraction, we flip the fraction upside down.

Examples

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

$$2) 4 \div \frac{1}{5} = 4 \times \frac{5}{1} = 4 \times 5 = 20$$

$$3) 8 \div \frac{1}{3} = 8 \times \frac{3}{1} = 8 \times 3 = 24$$

$$4) 3 \div \frac{2}{5} = 3 \times \frac{5}{2} = \frac{15}{2}$$

$$5) 6 \div \frac{3}{4} = 6 \times \frac{4}{3} = \frac{24}{3} = 8$$

$$6) 8 \div \frac{3}{7} = 8 \times \frac{7}{3} = \frac{56}{3}$$