

Lesson 4 – Adding and Subtracting Fractions

Starter

Fill in the missing numbers to make the fractions equivalent

a) $\frac{2}{3} = \frac{\square}{6}$

b) $\frac{4}{\square} = \frac{12}{18}$

c) $\frac{15}{20} = \frac{\square}{4}$

d) $\frac{\square}{4} = 2$

e) $\frac{10}{9} = \frac{\square}{72}$

Starter Answers

a) 4

b) 6

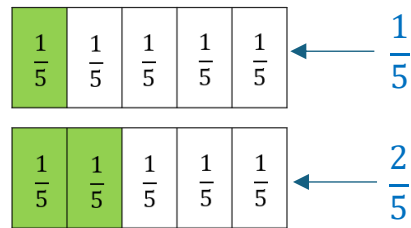
c) 3

d) 8

e) 80

Consider the calculation $\frac{1}{5} + \frac{2}{5}$

We could show this using a bar model:



In total we have three fifths. So $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

Notice that we do not add the denominators.

Example 1

Work out

1) $\frac{7}{11} + \frac{2}{11}$

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

3) $\frac{8}{9} + \frac{3}{9}$

Answers

1) $\frac{9}{11}$

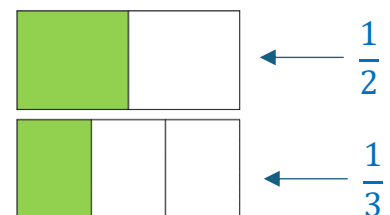
2) $\frac{3}{3} = 1$

3) $\frac{11}{9}$

Now consider the calculation $\frac{1}{3} + \frac{1}{2}$

We could show both of these fractions using a bar model:

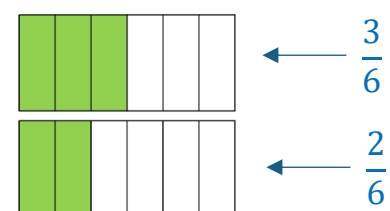
It's hard to see what we would have in total this time as the sections are different sizes.



Instead, we can split the models into sections that are the same size for both fractions.

Now we can see there are five sixths. So the answer is

$\frac{5}{6}$.

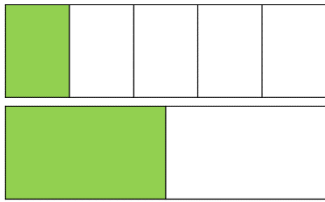


Why did we choose to split them into six?

6 is divisible by both 2 and 3. We call 6 the **common denominator**.

Example 2

Use the bar model to work out $\frac{1}{5} + \frac{1}{2}$



Answer

10 is divisible by both 5 and 2, so split the two bars into 10 sections each.



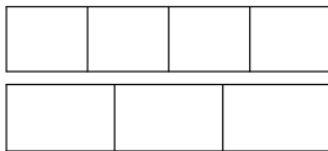
We can see that we have 7 tenths.

$$\text{So, } \frac{1}{5} + \frac{1}{2} = \frac{7}{10}$$

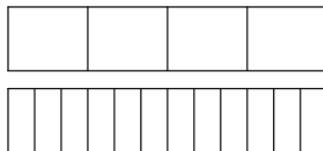
Your go

Use the bar models to work out the following calculations:

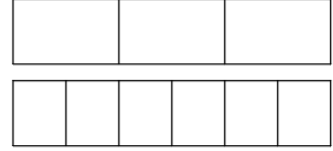
1) $\frac{1}{4} + \frac{1}{3}$



2) $\frac{1}{4} + \frac{7}{12}$



3) $\frac{2}{3} + \frac{1}{6}$

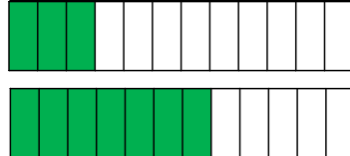


Answers

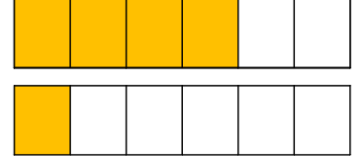
1) $\frac{7}{12}$



2) $\frac{10}{12} = \frac{5}{6}$



3) $\frac{5}{6}$



Now let's do this without using bar models.

Example 3

Work out:

$$1) \frac{1}{2} + \frac{5}{7}$$

First, we need to find a common denominator.
We look for a number that is divisible by 2 and 7.
In this case, the lowest number is 14.

$$\frac{1}{2} + \frac{5}{7} = \frac{\square}{14} + \frac{\square}{14}$$

Next, we find equivalent fractions to $\frac{1}{2}$ and $\frac{5}{7}$ that have 14 as the denominator

$$\frac{1}{2} = \frac{7}{14} \qquad \frac{5}{7} = \frac{10}{14}$$

So, we have:

$$\frac{7}{14} + \frac{10}{14} = \frac{17}{14}$$

We use the same method for **subtraction** too.

Example 2

Work out $\frac{5}{6} - \frac{1}{3}$

First, we find a common denominator.
6 is divisible by both 6 and 3, so we can choose 6 to be our common denominator.

$$\frac{5}{6} - \frac{1}{3} = \frac{\square}{6} - \frac{\square}{6}$$

$\frac{5}{6}$ already has 6 as the denominator, so we need to find an equivalent fraction to $\frac{1}{3}$ with 6 as the denominator.

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

So, we have:

$$\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$$

Your go

Work out and simplify your answers where possible.

$$1) \frac{1}{5} + \frac{2}{3}$$

$$2) \frac{7}{10} + \frac{4}{15}$$

$$3) \frac{3}{4} - \frac{1}{3}$$

$$4) \frac{18}{20} - \frac{3}{10}$$

$$5) \frac{3}{7} + \frac{5}{8}$$

Answers

$$1) \frac{13}{15}$$

$$2) \frac{29}{30}$$

$$3) \frac{5}{12}$$

$$4) \frac{3}{5}$$

$$5) \frac{59}{56}$$