Fractions- week beginning 4th May 2020

Work through these tasks at your own pace and level:

 If you find this part of maths tricky, start here. You can always move up to something spicier!

 Most people will want to start here. Fluency at this stage is really important before moving up. If you struggle, work on the lower level first, and come back to this.

 This is an extension. If you are happy at the level below, try this out and push yourself to reason with your maths.

Answers can be found at the end of the booklet. If your answers don't match – try the problem again and see if you can work out how to get to the correct answer.

Adding fractions

Adding and subtracting fractions:

When adding and subtracting fractions, the denominators must be the same. This is the bottom half of the fraction. Fractions are compared by changing the denominators to a common number. This can be done by multiplying the top and bottom of the fraction by the same number since this will give a fraction with an equivalent value. For example $\frac{1}{2}$ *can be multiplied by 2 (the top and bottom part of the fraction) so that it would become* $\frac{2}{4}$*. Now that the denominators are the same, they can be added:* $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$*. The same is applied for subtraction.*

$\frac{2}{3} + \frac{1}{6} =$ ☐

$\frac{1}{2} + \frac{1}{4} =$ ☐

$\frac{1}{4} + \frac{3}{8} =$ ☐

$\frac{1}{3} + \frac{1}{6} =$ ☐

$\frac{1}{8} + \frac{1}{2} =$ ☐

$\frac{1}{4} + \frac{5}{8} =$ ☐

$\frac{2}{3} + \frac{5}{12} =$ ☐

$\frac{3}{4} + \frac{1}{12} =$ ☐

$\frac{11}{12} + \frac{1}{4} =$ ☐

$\frac{5}{6} + \frac{7}{12} =$ ☐

$\frac{11}{12} + \frac{1}{6} =$ ☐

$\frac{7}{8} + \frac{5}{16} =$ ☐

$\frac{11}{16} + \frac{3}{8} =$ ☐

1) *Sally has* $\frac{2}{3}$ *of a sandwich left. She eats some more and then has* $\frac{1}{4}$ *left. How much did she eat?*
2) *Bob eats* $\frac{1}{5}$ *of a cake. Timmy then eats some more. Jeff then complains as there is only* $\frac{1}{9}$ *left. He says that Timmy much have eaten more than half of the cake. Is Jeff correct? Justify your answer with working out.*

Subtracting fractions

$\frac{1}{2} - \frac{1}{4} = \square$

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

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

$\frac{3}{4} - \frac{1}{2} = \square$

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

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

$\frac{17}{20} - \frac{4}{5} = \square$

$\frac{9}{20} - \frac{1}{4} = \square$

$\frac{17}{18} - \frac{2}{3} = \square$

$\frac{5}{6} - \frac{5}{18} = \square$

$\frac{23}{24} - \frac{7}{12} = \square$

$\frac{5}{6} - \frac{17}{24} = \square$

Find the missing fraction

$$\frac{3}{20} + \frac{1}{2} = \frac{\square}{\square} = \frac{18}{20}$$

Sue and Jim are given this missing number problem.

$$\_\_\_ - \frac{2}{4} = \frac{1}{4}$$

Sue thinks the missing fraction is 3/4. Jim thinks it is a different fraction.

Explain why it could be both.

$$\frac{3}{4} - \frac{1}{6} = \frac{A}{B}$$

Which of these numbers should replace the 'B'?

- 2
- 12
- 24
- Something else

Explain your answer.

Comparing fractions

When we compare fractions, we use three symbols: Greater than (>), less than (<) or equal to (=). Fractions are compared by changing the denominators to a common number. This can be done by multiplying the top and bottom of the fraction by the same number since this will give a fraction with an equivalent value. For example if you were comparing $\frac{2}{5}$ *and* $\frac{5}{6}$ both fractions would need to be multiplied because one is not a multiple of the other. $\frac{2}{5}$ can be multiplied by 6 to make $\frac{12}{30}$ and $\frac{5}{6}$ can be multiplied by 5 to make $\frac{25}{30}$. Now the denominators are the same, the two fractions can be compared.

$\frac{12}{30} < \frac{25}{30} = \frac{2}{5} < \frac{5}{6}$

1 a. $\frac{7}{9} \square \frac{7}{7}$

2 a. $\frac{7}{10} \square \frac{5}{10}$

3 a. $\frac{4}{7} \square \frac{4}{9}$

4 a. $\frac{6}{9} \square \frac{6}{12}$

5 a. $\frac{3}{8} \square \frac{2}{8}$

6 a. $\frac{6}{9} \square \frac{8}{9}$

1 a. $\frac{7}{9} \square \frac{7}{7}$

2 a. $\frac{7}{10} \square \frac{5}{10}$

3 a. $\frac{4}{7} \square \frac{4}{9}$

4 a. $\frac{6}{9} \square \frac{6}{12}$

5 a. $\frac{3}{8} \square \frac{2}{8}$

6 a. $\frac{6}{9} \square \frac{8}{9}$

1)

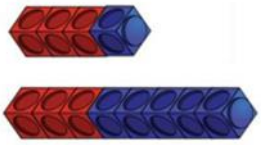
Russell says $\frac{3}{8} > \frac{3}{4}$

because 8 > 4. Do you agree?

Explain your reasoning.

2) Sam and Tim each had a sandwich each of the same size. Sam ate $\frac{4}{11}$ of his. Tim ate $\frac{4}{5}$ of his. Who ate the most?

Ron makes $\frac{3}{4}$ and $\frac{3}{8}$ out of cubes.



He thinks that $\frac{3}{8}$ is equal to $\frac{3}{4}$

Do you agree?
Explain your answer.

Ordering fractions:

When ordering fractions, the original fractions will need to be written from either smallest to largest or largest to smallest, depending on what the question asks. Like comparing, or adding and subtracting fractions, ***all*** *of the denominators must be the same in order to determine which fractions are bigger than the others.*

For example, you are asked to order the following fractions from smallest to largest:

$$\frac{1}{2}, \quad \frac{3}{4}, \quad \frac{4}{6}, \quad \frac{1}{4}, \quad \frac{2}{12}$$

These fractions can be multiplied so that their denominators are all 12:

$$\frac{6}{12}, \quad \frac{9}{12}, \quad \frac{8}{12}, \quad \frac{3}{12}, \quad \frac{2}{12}$$

Now, it is much easier to order them! Make sure you order them using the original fractions:

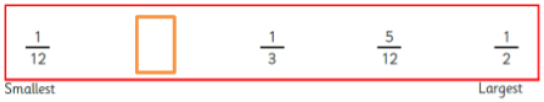
$$\frac{2}{12}, \quad \frac{1}{4}, \quad \frac{1}{2}, \quad \frac{4}{6}, \quad \frac{3}{4}$$

Order these fractions from smallest to largest:

1. $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{8}$,
2. $\frac{2}{5}$, $\frac{7}{10}$, $\frac{1}{2}$, $\frac{2}{2}$, $\frac{3}{5}$
3. $\frac{3}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{4}{6}$, $\frac{5}{12}$
4. $\frac{2}{3}$, $\frac{1}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{1}{2}$

1. $\frac{3}{4}$, $\frac{6}{10}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{1}{4}$
2. $\frac{4}{9}$, $\frac{2}{3}$, $\frac{1}{2}$, $\frac{5}{6}$, $\frac{1}{3}$
3. $\frac{2}{6}$, $\frac{2}{3}$, $\frac{5}{12}$, $\frac{1}{4}$, $\frac{7}{9}$
4. $\frac{2}{7}$, $\frac{2}{4}$, $\frac{11}{14}$, $\frac{3}{2}$, $\frac{5}{7}$

1) These fractions have been ordered from the smallest to the largest. What could the missing fraction be?



Always, sometimes, never?

If one denominator is a multiple of the other you can simplify the fraction with the larger denominator to make the denominators the same.

Example:

Could $\frac{?}{4}$ and $\frac{?}{12}$ be simplified to $\frac{?}{4}$ and $\frac{?}{4}$?

Prove it.

Answers

Adding fractions:

$\frac{2}{3} + \frac{1}{6} = \frac{5}{6}$

$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$

$\frac{1}{4} + \frac{3}{8} = \frac{5}{8}$

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

$\frac{1}{8} + \frac{1}{2} = \frac{5}{8}$

$\frac{1}{4} + \frac{5}{8} = \frac{7}{8}$

$\frac{2}{3} + \frac{5}{12} = 1\frac{1}{12}$

$\frac{3}{4} + \frac{1}{12} = \frac{5}{6}$

$\frac{11}{12} + \frac{1}{4} = 1\frac{1}{6}$

$\frac{5}{6} + \frac{7}{12} = 1\frac{5}{12}$

$\frac{11}{12} + \frac{1}{6} = 1\frac{1}{12}$

$\frac{7}{8} + \frac{5}{16} = 1\frac{3}{16}$

$\frac{11}{16} + \frac{3}{8} = 1\frac{1}{16}$

1) *Sally has $\frac{2}{3}$ of a sandwich left. She eats some more and then has $\frac{1}{4}$ left. How much did she eat?*

$\frac{2}{3} - ? = \frac{1}{4}$ $\frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

2) *Bob eats $\frac{1}{5}$ of a cake. Timmy then eats some more. Jeff then complains as there is only $\frac{1}{9}$ left. He says that Timmy much have eaten more than half of the cake. Is Jeff correct? Justify your answer with working out.*

Jeff is correct, because Bob ate 1/5 of cake which can be turned into 9/45. If there was only 1/9 which is the same as 5/45 it means that Timmy ate 31/45 of cake. Half of 45 would be 22.5 so Timmy definitely ate more than a half.

Subtracting fractions answers:

$\frac{1}{2} - \frac{1}{4} = \boxed{\frac{1}{4}}$

$\frac{1}{3} - \frac{1}{6} = \boxed{\frac{1}{6}}$

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

$\frac{3}{4} - \frac{1}{2} = \boxed{\frac{1}{4}}$

$\frac{5}{6} - \frac{1}{3} = \boxed{\frac{1}{2}}$

$\frac{17}{20} - \frac{4}{5} = \boxed{\frac{1}{20}}$

$\frac{9}{20} - \frac{1}{4} = \boxed{\frac{1}{5}}$

$\frac{17}{18} - \frac{2}{3} = \boxed{\frac{5}{18}}$

$\frac{5}{6} - \frac{5}{18} = \boxed{\frac{5}{9}}$

$\frac{23}{24} - \frac{7}{12} = \boxed{\frac{3}{8}}$

$\frac{5}{6} - \frac{17}{24} = \boxed{\frac{1}{8}}$

1) $\frac{5}{20}$
2) $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$ However, an equivalent fraction to $\frac{3}{4}$ could have also been used, such as $\frac{6}{8}$.
3) B could have been replaced with 12 or 24 because 4 and 6 are factors of them so equivalent fractions could be found. 18 was another denominator that B could have been.

Comparing fractions answers:

1 a. <

2 a. >

3 a. >

4 a. <

5 a. <

6 a. <

1 a. <

2 a. >

3 a. >

4 a. >

5 a. >

6 a. <

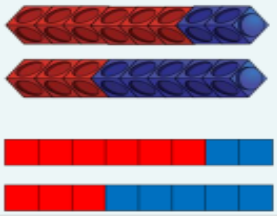
1) Russell is incorrect because $\frac{3}{4}$ is equivalent to $\frac{6}{8}$, which is greater then $\frac{3}{8}$.

2) $\frac{4}{11} = \frac{20}{55}$ $\frac{4}{5} = \frac{44}{55}$

Tim ate most.

3)

Possible answer:
I disagree with Ron because the two wholes are not equal. He could have compared using numerators or converted $\frac{3}{4}$ to $\frac{6}{8}$
If he does this he will see that $\frac{3}{4}$ is greater. Children may use bar models or cubes to show this.



Ordering fractions answers:

1) $\frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{3}{4}$

2) $\frac{2}{5}, \frac{1}{2}, \frac{3}{5}, \frac{7}{10}, \frac{2}{2}$

3) $\frac{1}{3}, \frac{5}{12}, \frac{1}{2}, \frac{4}{6}, \frac{3}{4}$

4) $\frac{1}{4}, \frac{1}{2}, \frac{2}{3}, \frac{5}{6}, \frac{7}{8}$

1) $\frac{1}{4}, \frac{2}{5}, \frac{1}{2}, \frac{6}{10}, \frac{3}{4}$

2) $\frac{1}{3}, \frac{4}{9}, \frac{1}{2}, \frac{6}{10}, \frac{3}{4}$

3) $\frac{1}{4}, \frac{2}{5}, \frac{1}{2}, \frac{2}{3}, \frac{5}{6}$

4) $\frac{2}{7}, \frac{5}{7}, \frac{2}{4}, \frac{11}{14}, \frac{3}{2}$

1) $\frac{2}{12}$ *or* $\frac{3}{12}$

2)

Sometimes

It does not work for some fractions e.g. $\frac{8}{15}$ and $\frac{3}{5}$

But does work for others e.g. $\frac{1}{4}$ and $\frac{9}{12}$