## Fractions - Class 5

Fractions, decimals and percentages are 3 different ways for showing a part of an integer (whole number). This class will focus on fractions while the following class will focus on decimals, percentages and conversions.

## What is a fraction?

Numerator: the top number of the fraction tells us how many parts we have Denominator: the bottom number of a fraction tells us how many parts make up one whole.


- numerator < denominator - the fraction is less than 1
- numerator > denominator - the fraction is greater than 1
- numerator $=$ denominator - the fraction is equal to one


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## Simplifying Fractions

An equivalent fraction is when two fractions are equal despite having different numbers :


## The first 4 fractions are equivalent to each other and the last is not

To simplify a fraction we need to find a number that divides into the top and bottom of a fraction :
$\stackrel{3}{9} \stackrel{3}{\div 3} \xrightarrow{3} \frac{1}{3}$
$\frac{2 \div 2}{10 \div \frac{2}{\div}} \frac{1}{5}$
$\stackrel{15}{20} \div \stackrel{5}{\div} \stackrel{3}{4}$
$\stackrel{8}{36} \underset{\div 4}{\rightarrow} \stackrel{2}{9}$

Often there is more than one way to simplify a fraction, but always remember to simplify it as much as you can!
Harder fractions can be simplified in stages, instead of all at once

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Question

Write the following fractions in order of size. Starting with the smallest fraction.

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## Adding and Subtracting Fractions

When we add fractions we need to make sure the numbers on the bottom are the same. We do this through cross multiplication :

$$
\begin{aligned}
& \frac{2}{5}+\frac{1}{3} \rightarrow \frac{2_{5}^{3}}{x_{3}} \nrightarrow \frac{1}{3}_{\times 5}^{\times 5} \rightarrow \frac{6}{15}+\frac{5}{15} \rightarrow \frac{11}{15} \\
& \frac{3}{4}+\frac{2}{5} \rightarrow \frac{3}{4} \not 5^{4}+\frac{2^{x 4}}{5}-\frac{15}{20}+\frac{8}{20} \longrightarrow \frac{23}{20}
\end{aligned}
$$

## Steps: <br> 1. cross multiply <br> 2. add the top numbers <br> 3. keep the bottom numbers the same

When we subtract fractions we need to make sure the numbers on the bottom are the same. We do this through cross multiplication:

$$
\begin{aligned}
& \frac{2}{5}-\frac{1}{3} \rightarrow \frac{2}{5} \not \underset{\times 3}{ } \nleftarrow \frac{1}{3}_{\times 5}^{\times 5} \rightarrow \frac{6}{15}-\frac{5}{15} \rightarrow \frac{1}{15} \\
& \frac{3}{4}-\frac{2}{5} \rightarrow \frac{x^{5}}{4} \leftrightarrows \frac{2}{4}^{\times 4} \rightarrow \frac{15}{20}-\frac{8}{20} \rightarrow \frac{7}{20}
\end{aligned}
$$

## Steps:

1. cross multiply
2. subtract the top numbers
3. keep the bottom numbers the same

Calculate the following

$$
\begin{aligned}
& \frac{3}{5}+\frac{2}{3} \\
& \frac{7}{8}-\frac{5}{6}
\end{aligned}
$$

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## Converting Between Mixed and Improper Fractions

## MIXED TO IMPROPER FRACTION

$1 \frac{1}{2} \circlearrowleft \rightarrow \frac{3}{2}$

1. multiply the whole number with the number on the bottom of the fraction
2. add this result to the top number of the fraction
3. keep the bottom number the same

## IMPROPER TO MIXED FRACTION



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

1. see how many of the bottom divide into the top
2. this result is the whole number in front and the remainder goes on top of the fraction
3. keep the bottom number the same

$$
2 \frac{1}{7}-1 \frac{1}{2} \rightarrow \frac{15}{7}-\frac{3}{2} \xrightarrow{\substack{\text { cross } \\ \text { MuTTPLY }}} \frac{30}{14}-\frac{21}{14}=\frac{9}{14}
$$

$2 \frac{5}{6}+1 \frac{3}{4} \rightarrow \frac{17}{6}-\frac{7}{4} \xrightarrow{\substack{\text { cross } \\ \text { MuLTIPY }}} \frac{68}{24}-\frac{42}{24}=\frac{26}{24} \xrightarrow{\text { simplify }} \frac{13}{12} \rightarrow 1 \frac{1}{12}$

Work out each of the following and give your answer as a mixed

$$
1 \frac{3}{5}+2 \frac{1}{4}
$$

$$
4 \frac{1}{5}-2 \frac{2}{3}
$$

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## Multiplying and Dividing Fractions

When we multiply fractions, all we need to do is multiply the top numbers together and then the bottom numbers, as simple as that!

$$
\frac{3}{10} \times \frac{5}{8}=\frac{15}{80}=\frac{3}{16} \quad \begin{aligned}
& \text { Any whole number can be } \\
& \text { seen as a fraction over } 1
\end{aligned}
$$

When we divide fractions, we need to follow the method of

## KEEP CHANGE FLIP

$$
\frac{3}{10} \div \frac{2}{3}=\frac{3}{10} \times \frac{3}{2}=\frac{9}{20}
$$

The first fraction was kept the same, the division sign changed to a multiplication, and the second fraction was flipped around.

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Questions

Calculate the following and give your answer in its simplest form...
$\frac{3}{10}$

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Questions

Calculate the following and give your answer in its simplest form...


2


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## Fractions of Amounts

When we find a fraction of an amount, we divide by the bottom number and multiply by the top :

## Multiplying first then dividing second, will get you to the same answer!

| $\substack{\text { multiply } \\ \text { of } 140 \\ 4 \\ \text { divide }}$ | $\frac{2}{5}$ of 360 | $\frac{1}{7}$ of 56 | $\frac{4}{9}$ of 99 |
| :--- | :--- | :--- | :--- |
| $140 \div 4=35$ | $360 \div 5=72$ | $56 \div 7=8$ | $99 \div 9=11$ |
| $35 \times 3=105$ | $72 \times 2=144$ | $8 \times 1=8$ | $11 \times 4=44$ |

$$
\frac{1}{4} \text { of } 28
$$

$\frac{5}{8}$ of 132

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Question - Scenario Problem

A stadium costs $£ 600$ million.
$\frac{13}{15}$ of this cost was for the building
The rest of the cost was for the land.

Work out the cost of the land.

