VULGAR FRACTIONS

Year 6 (England)
Primary 6 (Scotland)

What is a vulgar fraction ?

A vulgar fraction is one that has a numerator and a denominator.

Formally, a vulgar fraction is of the form $\frac{P}{Q}$ where P and Q are integers, $Q \neq 0$.

They are not to be confused with decimal fractions which feature a decimal point.

Lesson 1

Year 6, Primary 6, Mathematics
Vulgar Fractions

W.O.M.B.A.T

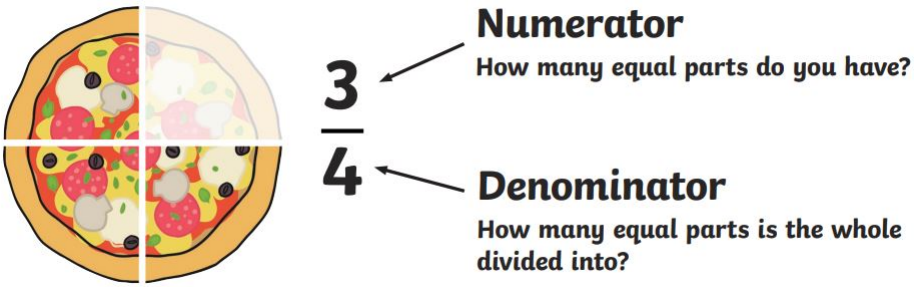
Wizards' Ordinary Mathematics and Basic Aptitude Test

1.1 Easy Adds

Some fractions are composed of two parts,

- an upper number called the numerator
- a lower number called the denominator

For example,



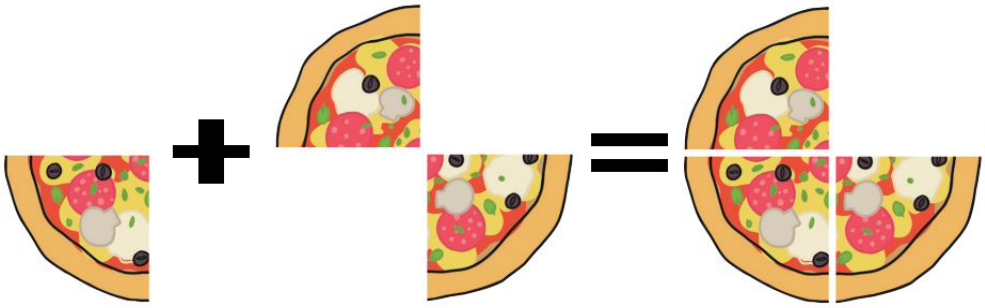
If two fractions have the same denominator then adding them is easy.

Calculate, $\frac{1}{4} + \frac{2}{4} =$

In words this question asked,

"What is one quarter of a pizza added to two quarters of a pizza ?"

And the answer given can be checked by drawing pizza,



To remember which is Numerator and which is **D**enominator: "**D** is **D**own".

1.2 Exercise

Marks Available : 12

Question 1

Write down a fraction which has a numerator of 5 and a denominator of 7.

[1 mark]

Question 2

Consider the fraction $\frac{7}{8}$

(i) Is the 7 called the numerator or the generator ?

[1 mark]

(ii) Is the 8 called the imitator or the denominator ?

[1 mark]

Question 3

What is $\frac{1}{5}$ of a pizza added to $\frac{2}{5}$ of a pizza ?

[2 marks]

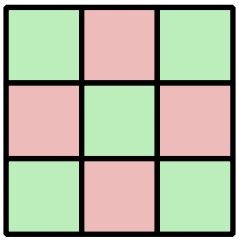
Question 4

What is $\frac{2}{8}$ of a cake added to $\frac{3}{8}$ of a cake ?

[2 marks]

Question 5

A slice of Battenberg cake is made of 9 equally sized square pieces.



Billy eats 4 pieces and Eddy eats 3.

(i) What fraction of the cake has been eaten ?

[2 marks]

(ii) Did Eddy eat $\frac{1}{2}$ the cake or $\frac{1}{3}$ of the cake ?

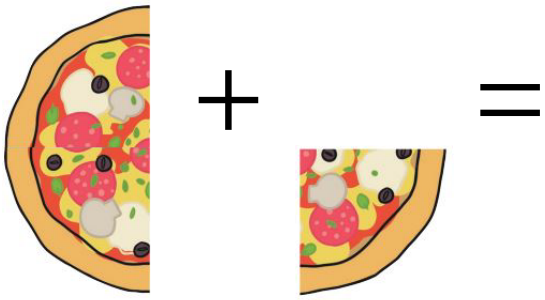
Explain your answer.

[3 marks]

1.3 Different Denominators

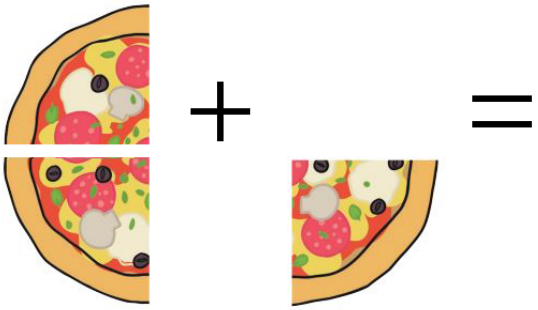
Adding two fractions which have different denominators is a new problem.
We solve it by turning it into the sort of problem we already know how to solve.
For example, suppose you are asked,

What is half a pizza added to a quarter of a pizza ?



We want to work out what $\frac{1}{2} + \frac{1}{4}$ is equal to.

The key idea is to write the half as two quarters, because then,



So, $\frac{\mathbf{1}}{\mathbf{2}} + \frac{1}{4} = \frac{\mathbf{2}}{\mathbf{4}} + \frac{1}{4}$ which we know how to work out.

Mathematically, to do this without having to draw lots of pizza all the time, we make use of two magical property of the number 1.

The first is that,

$\Rightarrow \Rightarrow \Rightarrow$ **Any number multiplied by 1 is itself** $\Leftarrow \Leftarrow \Leftarrow$

For example.

$$7 \times 1 = 7, \qquad 23 \times 1 = 23, \qquad \frac{2}{3} \times 1 = \frac{2}{3}$$

The second piece of wizardry is that,

$\Rightarrow \Rightarrow \Rightarrow$ **Any number divided by itself is one** $\Leftarrow \Leftarrow \Leftarrow$

For example,

$$\frac{2}{2} = 1, \qquad \frac{3}{3} = 1, \qquad \frac{4}{4} = 1, \qquad \frac{5}{5} = 1$$

We actually are going to use this backwards and replace a 1 with whichever of these helps us most. This is a little tricky to get the hang of so you may want your teacher to walk you through the two examples on the next page.

Example #1

Showing all the steps, work out $\frac{1}{2} + \frac{1}{8}$

$\frac{1}{2} + \frac{1}{4} = \frac{1}{2} \times \mathbf{1} + \frac{1}{4}$ Step 1: Multiply by 1

$= \frac{1}{2} \times \frac{\mathbf{2}}{\mathbf{2}} + \frac{1}{4}$ Step 2: Write 1 in a more useful way

$= \frac{2}{4} + \frac{1}{4}$ Step 3: Do the multiplication

$= \frac{3}{4}$ Step 4: Do the common denominator addition

Example #2

Showing all the steps, work out $\frac{2}{5} + \frac{7}{15}$

$\frac{2}{5} + \frac{7}{15} = \frac{2}{5} \times \mathbf{1} + \frac{7}{15}$ Step 1: Multiply by 1

$= \frac{2}{5} \times \frac{\mathbf{3}}{\mathbf{3}} + \frac{7}{15}$ Step 2: Write 1 in a more useful way

$= \frac{6}{15} + \frac{7}{15}$ Step 3: Do the multiplication

$= \frac{13}{15}$ Step 4: Do the common denominator addition

1.4 Exercise

Marks Available : 25

Question 1

Showing all the steps, work out $\frac{1}{2} + \frac{1}{8}$

[4 marks]

Question 2

Showing all the steps, work out $\frac{2}{5} + \frac{3}{10}$

[4 marks]

Question 3

Showing all the steps, work out $\frac{2}{3} + \frac{1}{9}$

[4 marks]

Question 4

Showing all the steps, work out $\frac{3}{5} + \frac{7}{20}$

[4 marks]

Question 5

Work out, $\frac{1}{2} - \frac{1}{8}$

[4 marks]

Question 6

Work our, $\frac{4}{5} - \frac{8}{15}$

[5 marks]