

Knowledge Organiser: Year 7 Maths; Structure of number – Fractions (Part 1)



Keywords

Factor: numbers we multiply together to make another number
Multiply: the result of multiplying a number by an integer.
HCF: highest common factor. The biggest factor that numbers share.
LCM: lowest common multiple. The first multiple numbers share.
Prime: an integer with only 2 factors.

Multiples

The "times table" of a given number

All the numbers in this lists below are multiples of 3.

3, 6, 9, 12, 15...

This list continues and doesn't end

$3x, 6x, 9x \dots$

x could take any value and as the variable is a multiple of 3 the answer will also be a multiple of 3

Non example of a multiple

4.5 is not a multiple of 3 because it is 3×1.5

Not an integer

Factors

Arrays can help represent factors

5×2 or 2×5

Factors of 10
1, 2, 5, 10

10×1 or 1×10

Factors and expressions

$x \ x \ x \ x \ x \ x$

$6x \times 1$ OR $6 \times x$

$x \ x$

$x \ x$

$2x \times 3$

$x \ x \ x$

$x \ x \ x$

The number itself is always a factor

Factors of $6x$

$6, x, 1, 6x, 2x, 3, 3x, 2$

$3x \times 2$

Prime numbers

- Integer
- Only has 2 factors
- and itself

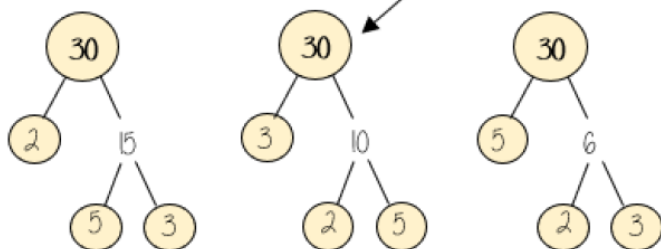
The first prime number
The only even prime number

Learn or how-to quick recall...

2, 3, 5, 7, 11, 13, 17, 19, 23, 29...

Product of prime factors

Multiplication part-whole models



All three prime factor trees represent the same decomposition

$30 = 2 \times 3 \times 5$

Multiplication of prime factors

Using prime factors for predictions

eg 60 30×2 $2 \times 3 \times 5 \times 2$

150 30×5 $2 \times 3 \times 5 \times 5$

Finding the HCF and LCM

HCF – Highest common factor

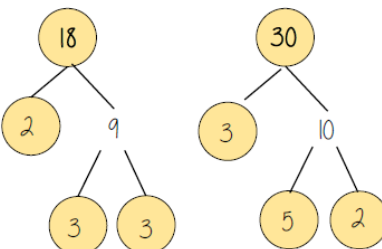
HCF of 18 and 30

18 $1, 2, 3, 6, 9, 18$

30 $1, 2, 3, 5, 6, 10, 15, 30$

6 is the biggest factor they share

HCF = 6



LCM – Lowest common multiple

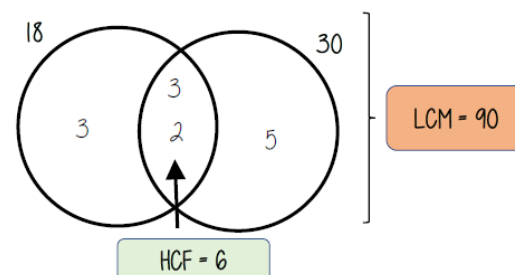
LCM of 18 and 30

18 $18, 36, 54, 72, 90$

30 $30, 60, 90$

The first time their multiples match

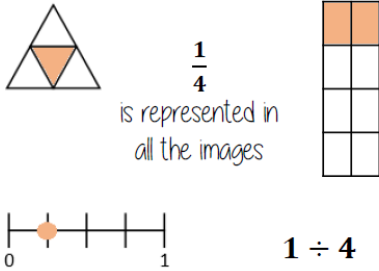
LCM = 90



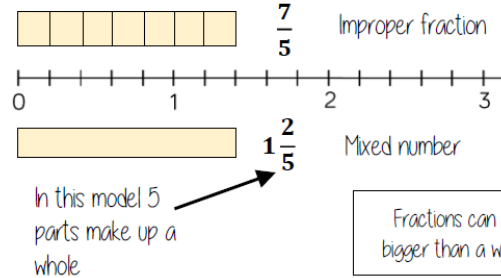


Knowledge Organiser: Year 7 Maths; Structure of number – Fractions (Part 2)

Representing Fractions

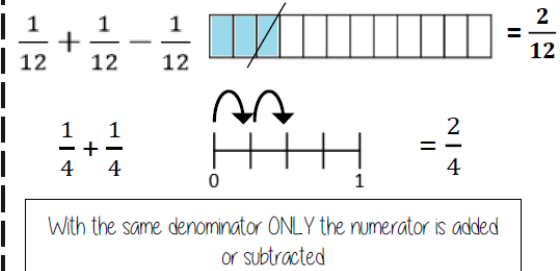


Mixed numbers and fractions



Add/Subtract unit fractions

Same denominator

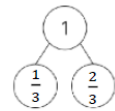


Add/Subtract fractions

Same denominator

$$\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$$

Sequences



$$\frac{1}{3}, 1, 1 \frac{2}{3}, 2 \frac{1}{3}, 3, \dots$$

Represent this on a number line to help

Add/Subtract from integers

$$1 - \frac{2}{6} = \frac{4}{6}$$

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

The denominator indicates the number of parts a whole is made up of

Equivalent fractions

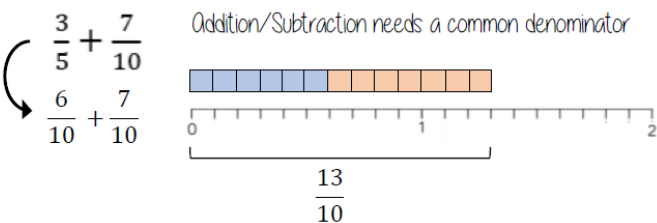
Numerator and denominator have the same multiplier

$$\frac{2}{3} = \frac{4}{6}$$

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

Add/Subtraction fractions (common multiples)

Addition/Subtraction needs a common denominator



Add/Subtraction any fractions

$$\frac{4}{5} - \frac{2}{3} = \frac{12}{15} - \frac{10}{15} = \frac{2}{15}$$

Use equivalent fractions to find a common multiple for both denominators

Ordering Fractions

E.g. Which is bigger, $\frac{2}{3}$ or $\frac{3}{4}$?

$$\frac{2}{3} \times 4 = \frac{8}{12}$$

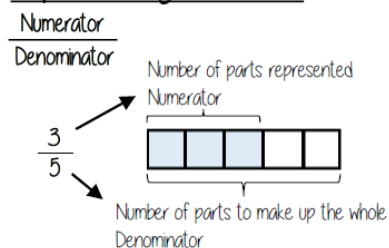
$$\frac{3}{4} \times 3 = \frac{9}{12}$$

- 1) Look at the **bottom numbers** ('denominators') of the fractions: **3** and **4**.
- 2) Think of a number they will **both go into** — try **12**.
- 3) Change each fraction (make **equivalent** fractions) so the **bottom number** is **12**.
- 4) Now check which is bigger by looking at their **top numbers** ('numerators').
- 5) **9** is bigger than **8**, so **$\frac{3}{4}$ is bigger than $\frac{2}{3}$** .

Fraction Ordering Competition

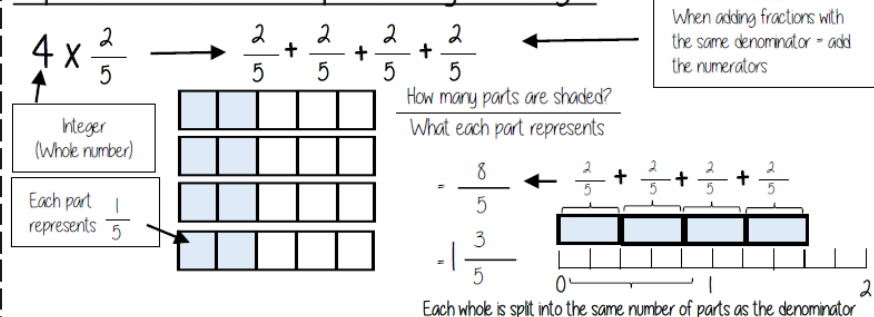
Year 7: Half Term 5 – Structure of number: Fractions

Representing a fraction



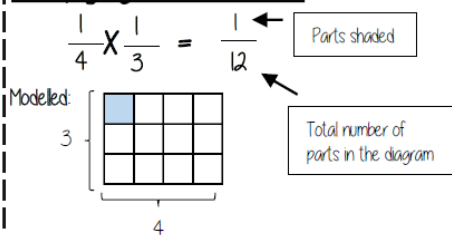
ALL PARTS of a fraction are of equal size

Repeated addition = multiplication by an integer

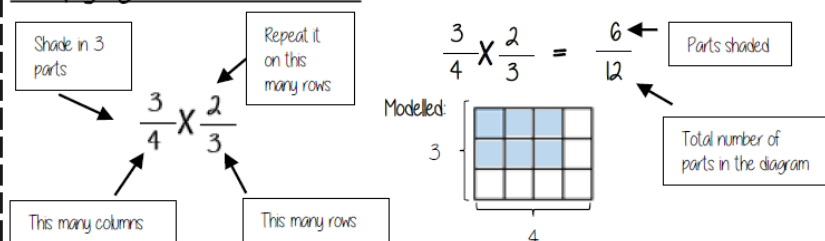


Revisit
When adding fractions with the same denominator = add the numerators

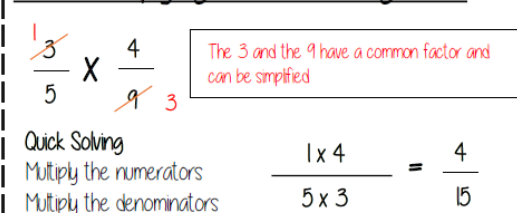
Multiplying unit fractions



Multiplying non-unit fractions

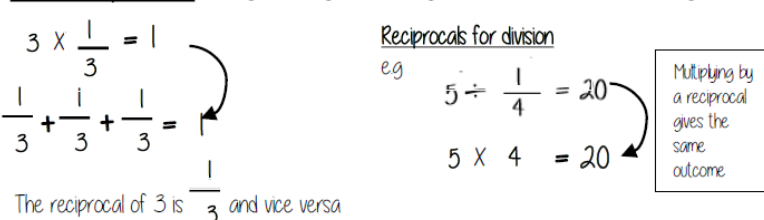


Quick Multiplying and Cancelling down

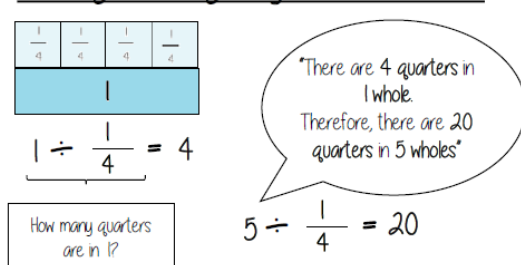


The reciprocal

When you multiply a number by its reciprocal the answer is always 1

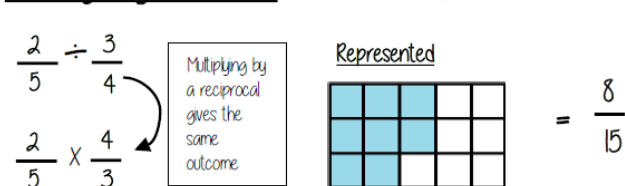


Dividing an integer by an unit fraction



Dividing any fractions

Remember to use reciprocals



Keywords

Numerator: the number above the line on a fraction. The top number. Represents how many parts are taken.

Denominator: the number below the line on a fraction. The number represents the total number of parts.

Whole: a positive number including zero without any decimal or fractional parts.

Commutative: an operation is commutative if changing the order does not change the result.

Unit Fraction: a fraction where the numerator is one and denominator a positive integer.

Non-unit Fraction: a fraction where the numerator is larger than one.

Dividend: the amount you want to divide up.

Divisor: the number that divides another number.

Quotient: the answer after we divide one number by another. eg dividend ÷ divisor = quotient

Reciprocal: a pair of numbers that multiply together to give 1





How do we use Knowledge Organisers in Mathematics?

How can you use knowledge organisers at home to help us?

- **Retrieval Practice:** Read over a section of the knowledge organiser, cover it up and then write down everything you can remember. Repeat until you remember everything.
- **Flash Cards:** Using the Knowledge Organisers to help on one side of a piece of paper write a question, on the other side write an answer. Ask someone to test you by asking a question and seeing if you know the answer.
- **Mind Maps:** Turn the information from the knowledge organiser into a mind map. Then reread the mind map and on a piece of paper half the size try and recreate the key phrases of the mind map from memory.
- **Sketch it:** Draw an image to represent each fact; this can be done in isolation or as part of the mind map/flash card.
- **Teach it:** Teach someone the information on your knowledge organiser, let them ask you questions and see if you know the answers.

How will we use knowledge organisers in Mathematics?

Knowledge organisers will be used before I complete a Learning Check or Common Assessment. I will spend part of the lesson looking over each of the key topics of the half term before completing the Learning Check or Common Assessment.

I will also use these at home to complete my own independent learning and revision of these key topics.

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