Mathematics - Proportional Reasoning

Year 8

What do I need to be able to do?

By the end of this unit you should be able to:

- Carry out any multiplication or division using fractions and integers.
- Solutions can be modelled, described and reasoned

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 represent, the total number of parts.

Multiplying & Dividing

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

Reciprocat a pair of numbers that multiply together to give 1



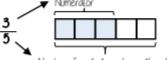
When adding fractions with

4

<u>Representing a fraction</u>

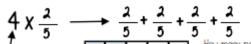
Numerator Denominator

Number of parts represented Numerator



Number of parts to make up the whole Denominator

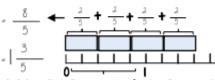
Repeated addition - multiplication by an integer



Each part | represents 5

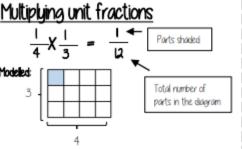
Integer (Whole number) the same denominator - add the numerators

What each part represents

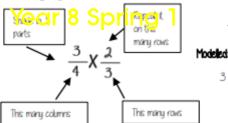


Each whole is split into the same number of parts as the denominator

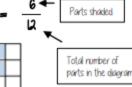
OLL PORTS of a fraction are of equal size



Multiplying non-unit fractions



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



Quick Multiplying and Cancelling down

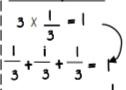


The 3 and the 9 have a common factor and can be simplified

Quick Solving

Multiply the numerators Multiply the denominators $\frac{1x4}{5x3} = \frac{4}{15}$

The reciprocal when you multiply a number by its reciprocal the answer is always I



The reciprocal of 3 is $\frac{!}{3}$ and vice versa

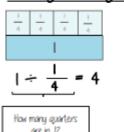
Reciprocals for division

$$5 \div \frac{1}{4} = 20$$

$$5 \times 4 = 20$$

Multiplying by a reciprocal gives the same outcome

Dividing an integer by an unit fraction



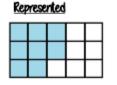
There are 4 quarters in 1 whole.

Therefore, there are 20 quarters in 5 wholes $\frac{1}{4} = 20$

Dividing any fractions Remember to use reciprocals



Multiplying by a reciprocal gives the same outcome



= 8 5

Mathematics - Representations

Working in the Cartesian

Year 8

What do I need to be able to do?

By the end of this unit you should be able to:

- Label and identify lines parallel to the
- Recognise and use basic straight lines
- Identify positive and negative gradients
- Link linear graphs to sequences
- Plot u = mx + c araphs

Keywords

Quadrant: four quarters of the coordinate plane.

Coordinate: a set of values that show an exact position.

Horizontal: a straight line from left to right (parallel to the x axis)

Vertical: a straight line from top to bottom (parallel to the y axis)

Origin: (0,0) on a graph. The point the two axes cross

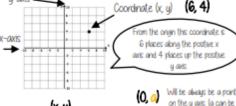
Parallel: Lines that never meet

Gradient: The steepness of a line

I Intercept: Where lines cross

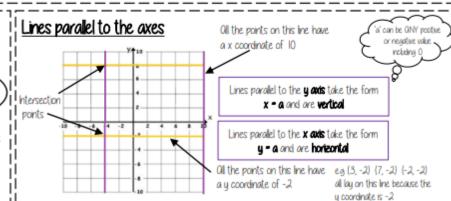


Coordinates in four quadrants Coordinate (x, y)

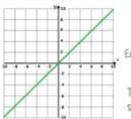


always the position on the u axis second

any number) Will be always be a point any number)



Recognise and use the line y-x



Olways the /

postion on the

x axis first

This means the x and the y coordinate have the same

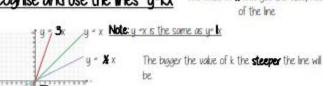
Examples of coordinates on this line (0, 0) (-3, -3) (8, 8)

The axes scale is important — if the scale is the same y = x will be a straight line at 45°

Recognise and use the lines u-kx

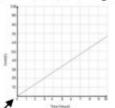
They will always go

through (0,0)



The closer to 0 the value of k the closer the line will be to the x oxis

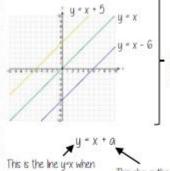
======== Direct Proportion using y-kx



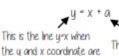
The line must be straight to be directly proportional — variables increase at the same rate k

Direct proportion graphs always start at (0,0) as they are describing relationships between two variables

Lines in the form y = x + a



because the gradients



the same

П

П

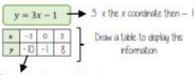
11

11

This shows the translation I of that line ! egy = x +51

is the line yex moved 5 | places up the graph ! 5 has been added to each of the x coordinates

Plottina u = mx + c araphs



This represents a coordinate pair (-3, -10)



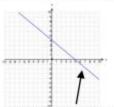
a straight line

You only need two points to form

Plotting more points helps you decide if your calculations are correct lifthey do make a straight Inel

Remember to join the points to make a line

Lines with negative gradients



Only straight-line graph with a negative x value has a negative gradient

Eg 4 = -2x

Direction of all negative gradients