MADANI GIRLS SCHOOL YEAR 7 HALF TERM 3

MATHS

Addition & Subtraction Of Fractions-Keywords

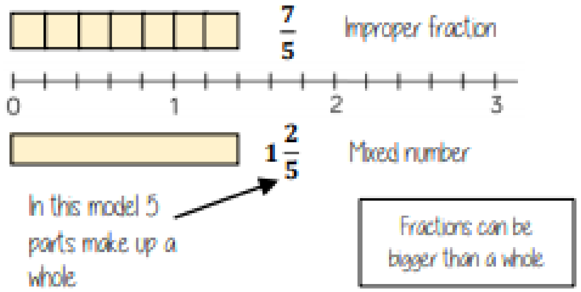
Numerator: the number above the line on a fraction. The top number. Represents how many parts are taken
Denominator: the number below the line on a fraction. The number represent the total number of parts
Equivalent: of equal value
Mixed numbers: a number with an integer and a proper fraction
Improper fractions: a fraction with a bigger numerator than denominator
Substitute: replace a variable with a numerical value
Place value: the value of a digit depending on its place in a number. In our decimal number system, each place is 10 times bigger than the place to its right

What I Need To Be Able To Do

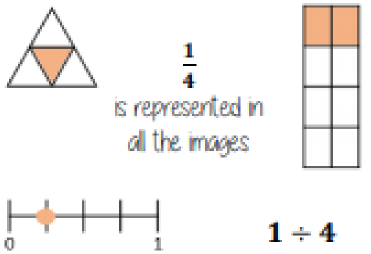
By the end of this unit you should be able to:

- Convert between mixed numbers and fractions
- Add/Subtract unit fractions (same denominator)
- Add/Subtract fractions (same denominator)
- Add/Subtract fractions from integers
- Use equivalent fractions
- Add/Subtract any fractions
- Add/Subtract improper fractions and mixed numbers
- Use fractions in algebraic contexts

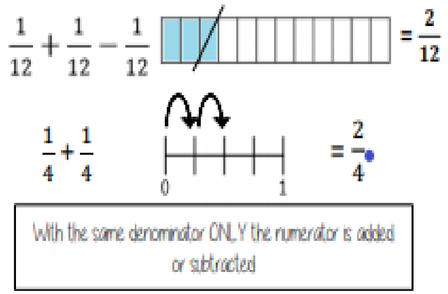
Mixed Numbers and Fractions



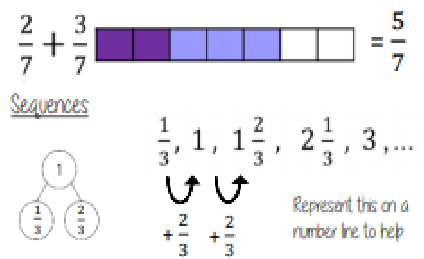
Representing Fractions



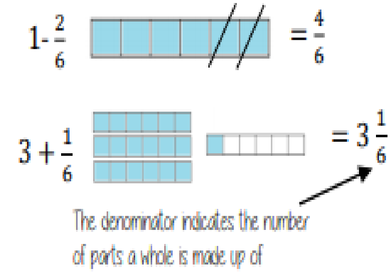
Add/Subtract Unit Fractions



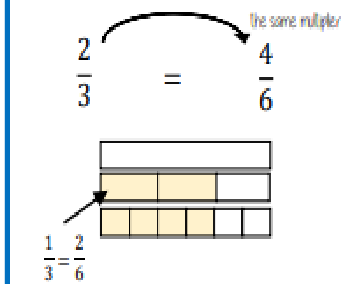
Add/Subtract Fractions



Add/Subtract From Integers



Equivalent Fractions



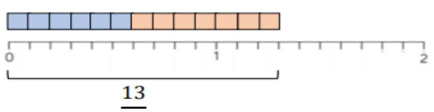
Add/Subtract Fractions

Add/Subtraction fractions (common multiples)

$\frac{3}{5} + \frac{7}{10}$

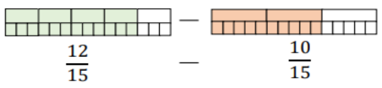
$\frac{6}{10} + \frac{7}{10}$

Addition/Subtraction needs a common denominator



Add/Subtraction any fractions

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



$= \frac{2}{15}$

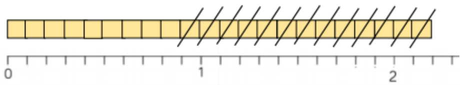
Use equivalent fractions to find a common multiple for both denominators

Add/Subtract Fractions (Improper Fixed)

$2\frac{1}{5} - 1\frac{3}{10}$

$2\frac{2}{10}$

$\frac{22}{10} - \frac{13}{10} = \frac{9}{10}$



- Convert to an improper fraction
- Calculate with common denominator

Partitioning method

$2\frac{1}{5} - 1\frac{3}{10} = 2\frac{2}{10} - 1\frac{3}{10} = 2\frac{2}{10} - 1 - \frac{3}{10} = 1\frac{2}{10} - \frac{3}{10} = \frac{9}{10}$

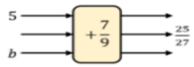
Fractions

Fractions in algebraic contexts

$k - \frac{5}{8} = 2$

Apply inverse operations

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



Form expressions with fractions

$b + \frac{7}{9} \longrightarrow b + \frac{7}{9}$

$p = 5 \quad m = 2$

$\frac{p}{8} + \frac{1}{m}$

Substitution

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

Fractions and decimals

$\frac{1}{10} = 0.1$

$\frac{1}{100} = 0.01$

Example

$\frac{6}{10} + 0.3 \longrightarrow 0.6 + 0.3$

$\frac{6}{10} + \frac{3}{10}$

Remember to use equivalent fractions and common denominators

HONESTY | **E**XCELLENCE | **A**CCOUNTABILITY | **R**ESPECT | **T**EAMWORK

MADANI GIRLS SCHOOL YEAR 8 HALF TERM 3

MATHS

Fractions & Percentages-Keywords

Percent: parts per 100 – written using the % symbol
Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals
Fraction: a fraction represents how many parts of a whole value you have.
Equivalent: of equal value.
Reduce: to make smaller in value.
Growth: to increase/ to grow.
Integer: whole number, can be positive, negative or zero.
Invest: use money with the goal of it increasing in value over time (usually in a bank)

What I Need To Be Able To Do

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

- Convert between FDP less than and more than 100
- Increase or decrease using multipliers
- Express an amount as a percentage
- Find percentage change

Convert FDP

$\frac{70}{100}$ → This also means 70 ÷ 100 → 70 out of 100 squares → 70 hundredths = 70%

70 "hundredths" = 7 "tenths" = 0.7

Using a calculator: $\frac{■}{□}$ → S⇔D → Convert to a decimal

This will give you the answer in the simplest form

× 100 converts to a percentage

Be careful of recurring decimals
eg $\frac{1}{3}$ = 0.3333333 = $0.\dot{3}$
The dot above the 3

Fraction/ Percentage of Amount

Find $\frac{3}{5}$ of £60

£60: £12 | £12 | £12 | £12 | £12

£36

Remember $\frac{3}{5}$ = 60%

10% of £60 = £6
50% of £60 = £30
60% of £60 = £36

Remember $\frac{3}{5}$ = 60% = 0.6

60% of £60
= 0.6 x 60
= £36

Percentage Decrease

100%

42% | **Decrease by 58%**

100% − 58% = 42%

100 – 0.58 = 0.42 ← **Multiplier** Less than 1

Percentage Increase

100% | 12%

Increase by 12%

100% + 12% = 112%

1.00 + 0.12 = 1.12 ← **Multiplier** More than 1

Express as a %

Express as a % - Non-calculator Percent – per hundred

7 per every 10 are orange: $\frac{7}{10}$ | This means that 70 per every 100 are orange: $\frac{70}{100}$ | 70%

27 per every 50 shaded: $\frac{27}{50}$ | 54 per every 100 shaded: $\frac{54}{100}$ | 54%

Denominator 100 | Equivalent fractions

Express as a % - Calculator

Rosie

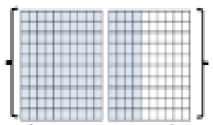
$\frac{13}{30}$ → $\frac{■}{□}$ → $\frac{13}{30}$ → × 100 → 43.3333...% 43%

Can't use equivalence easily to find 'per hundred'

This the same as 13 ÷ 30

Decimal percentages are still a percentage

Convert FDP < and > 100%



100 hundredths
10 tenths
100%

40 hundredths
4 tenths
40%

140 hundredths
14 tenths
140%

100% + 40%
1 + 0.40
= 1.40

Percentage Change

Percentage change

I bought a phone for £200. A year later sold it for £125.

100%
£200
£125

All values of change compare to the ORIGINAL value

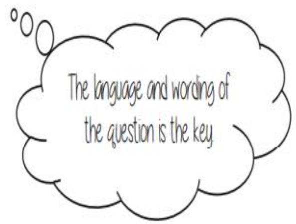
Percentage loss
$\frac{75}{200}$ × 100 = 37.5%

$\frac{\textbf{Difference in value}}{\textbf{Original value}} \times 100$

I bought a house for £180,000. I later sold it for £216,000

100%
£180,000

Percentage profit
Money made (profit value) → $\frac{36000}{180000}$ × 100 = 20%



The language and wording of the question is the key

Have you represented the Question in a bar model?

Can you use a calculator?

HONESTY | EXCELLENCE | ACCOUNTABILITY | RESPECT | TEAMWORK

Trigonometry-Keywords

Enlarge: to make a shape bigger (or smaller) by a given multiplier (scale factor)
Scale Factor: the multiplier of enlargement
Constant: a value that remains the same
Cosine ratio: the ratio of the length of the adjacent side to that of the hypotenuse. The sine of the complement.
Sine ratio: the ratio of the length of the opposite side to that of the hypotenuse.
Tangent ratio: the ratio of the length of the opposite side to that of the adjacent side
Inverse: function that has the opposite effect.
Hypotenuse: longest side of a right-angled triangle. It is the side opposite the right-angle.

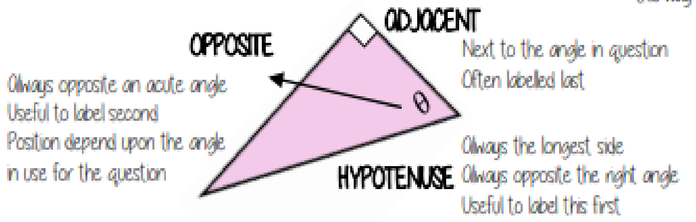
What I Need To Be Able To Do

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

- Work fluently with hypotenuse, opposite and adjacent sides
- Use the tan, sine and cosine ratio to find missing side lengths
- Use the tan, sine and cosine ratio to find missing angles
- Calculate sides using Pythagoras' Theorem

Hypotenuse, Adjacent & Opposite

Hypotenuse, adjacent and opposite — ONLY right-angled triangles are labelled in this way



Ratio In Right-angled Triangles

Ratio in right-angled triangles

When the angle is the same the ratio of sides a and b will also remain the same

a : b
1 : 2
$\frac{a}{b} = \frac{1}{2}$

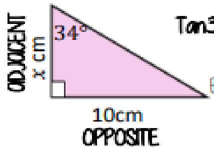
a : b
x : 100
50 : 100

a : b
0.07 : x
0.07 : 0.14

Tangent Ratio: Side Lengths

$\text{Tan}\,\theta = \frac{\text{opposite side}}{\text{adjacent side}}$

Substitute the values into the tangent formula



$\text{Tan}34 = \frac{10}{x}$

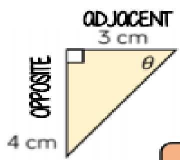
Equations might need rearranging to solve

$x \times \text{Tan}34 = 10$

$x = \frac{10}{\text{Tan}34} = 14.8\text{cm}$

Sin, Cos, Tan: Angles

Inverse trigonometric functions



Label your triangle and choose your trigonometric ratio

Substitute values into the ratio formula

$\text{Tan}\,\theta = \frac{3}{4}$

$\theta = \text{Tan}^{-1}\frac{3}{4}$

$\theta = 36.9°$

$\theta = \text{Tan}^{-1}\frac{\text{opposite side}}{\text{adjacent side}}$

$\theta = \text{Sin}^{-1}\frac{\text{opposite side}}{\text{hypotenuse side}}$

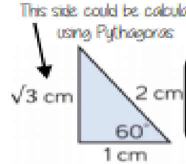
$\theta = \text{Cos}^{-1}\frac{\text{adjacent side}}{\text{hypotenuse side}}$

Key Angles

Key angles

This side could be calculated using Pythagoras

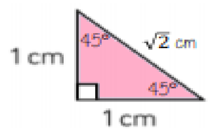
Because trig ratios remain the same for similar shapes you can generalise from the following statements



$\text{Tan}30 = \frac{1}{\sqrt{3}}$ $\text{Tan}60 = \sqrt{3}$

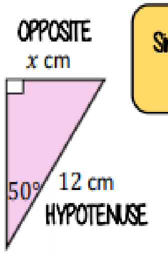
$\text{Cos}30 = \frac{\sqrt{3}}{2}$ $\text{Cos}60 = \frac{1}{2}$

$\text{Sin}30 = \frac{1}{2}$ $\text{Sin}60 = \frac{\sqrt{3}}{2}$



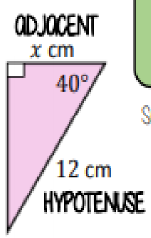
$\text{Tan}45 = 1$ $\text{Cos}45 = \frac{1}{\sqrt{2}}$ $\text{Sin}45 = \frac{1}{\sqrt{2}}$

Sin, Cos Ratio: Side Lengths



$\text{Sin}\,\theta = \frac{\text{opposite side}}{\text{hypotenuse side}}$

NOTE
The Sin(x) ratio is the same as the Cos(90-x) ratio



$\text{Cos}\,\theta = \frac{\text{adjacent side}}{\text{hypotenuse side}}$

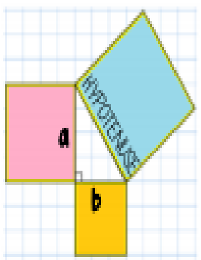
Substitute the values into the ratio formula

Equations might need rearranging to solve

Pythagoras theorem

Pythagoras theorem R

$\text{Hypotenuse}^2 = a^2 + b^2$



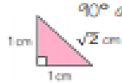
This is commutative – the square of the hypotenuse is equal to the sum of the two squares of the two shorter sides

Places to look out for Pythagoras
- Perpendicular heights in isosceles triangles
- Diagonals on right angled shapes
- Distance between coordinates
- Any length made from a right angles

Key Angles 0 Degrees and 90 Degrees

$\text{Tan}0 = 0$ ~~Tan90~~

This value cannot be defined – it is impossible as you cannot have two 90° angles in a triangle



$\text{Sin}0 = 0$ $\text{Sin}90 = 1$

$\text{Cos}0 = 1$ $\text{Cos}90 = 0$