Mathematics – Fractions

What do I need to be able to do?

Use equivalence to simplify, compare and order fractions

Four operations with fractions

Four operations with mixed numbers

Fractions of amounts, including finding the original amount

Solve problems with fractions on a calculator

'Show that' questions

Add and subtract algebraic fractions

Multiply and divide algebraic fractions

Keywords:

Numerator : the number above the line on a fraction. The top number.

Denominator: the number below the line on a fraction. The bottom number

Improper Fraction: numerator is larger than the denominator

Mixed Number: a whole number with a fraction eg $2^1/_5$

Reciprocal: the result of dividing 1 by that number. Flip a fraction to get its reciprocal

ORDERING FRACTIONS

Use **equivalent fractions** with the **same denominator**.

Put these fractions in order, from smallest to largest.

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

$\frac{12}{20}$ $\frac{10}{20}$ $\frac{15}{20}$

Rewrite the **original fractions** in size order.

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

ADDING/SUBTRACTING FRACTIONS

When we add or subtract fractions we must have a common denominator.

$\frac{1}{6} + \frac{5}{9}$

Numerator & Denominator × 3

Numerator & Denominator × 2

$\frac{3}{18} + \frac{10}{18} = \frac{13}{18}$

MULTIPLYING FRACTIONS

To quickly multiply fractions we multiply the numerators and multiply the denominators

$\frac{5}{6} \times \frac{3}{5} = \frac{15}{30} = \frac{1}{2}$

(5 x 3) = (15)

(6 x 5) = (30)

Can we simplify this fraction?

DIVIDING FRACTIONS

Dividing is the same as multiplying by the reciprocal.

$\frac{2}{3} \div \frac{1}{5} =$

Change the sign. Flip the divisor.

KEEP CHANGE FLIP

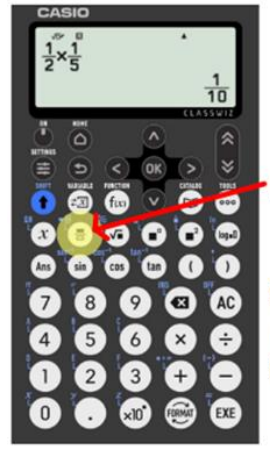
$\frac{2}{3} \times \frac{5}{1} = \frac{10}{3} = 3\frac{1}{3}$

CALCULATING WITH MIXED NUMBERS

Convert to improper fractions first

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

$\frac{7}{2} \times \frac{7}{3} = \frac{49}{6} = 8\frac{1}{6}$



Fraction button

Press SHIFT for the mixed number button

Mathematics – Angles & Polygons

What do I need to be able to do?

- Identify alternate angles
- Identify corresponding angles
- Identify co-interior angles
- Find the sum of interior angles in polygons
- Find the sum of exterior angles in polygons
- Find interior angles in regular polygon

Keywords:

Parallel: Straight lines that never meet

Angle: The figure formed by two straight lines meeting (measured in degrees)

Transversal: A line that cuts across two or more other (normally parallel) lines

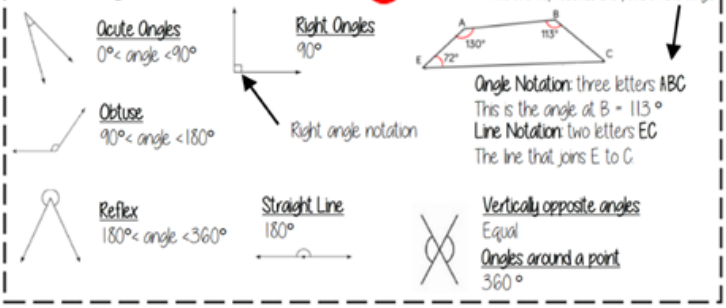
Isosceles: Two equal size lines and equal size angles (in a triangle or trapezium)

Polygon: A 2D shape made with straight lines

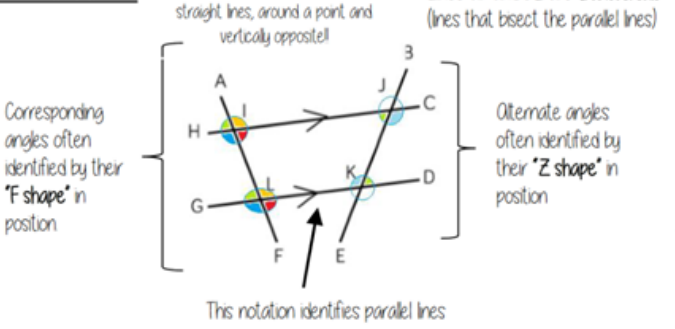
Sum: Addition (total of all the interior angles added together)

Regular polygon: All the sides have equal length; all the interior angles have equal size.

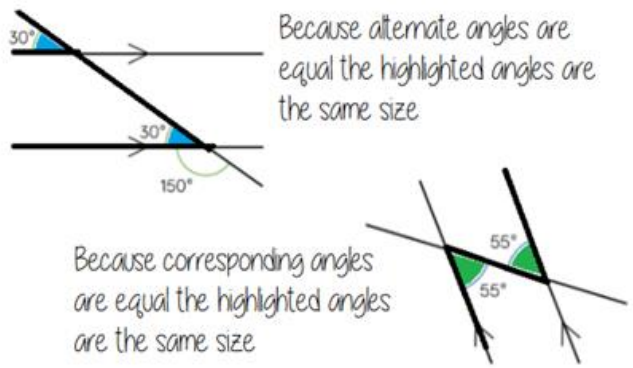
Basic angle rules and notation (R)



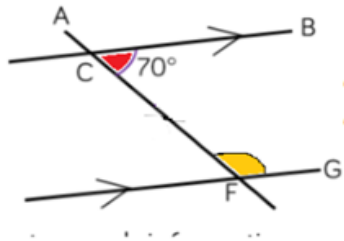
Parallel lines



Alternate/ Corresponding angles



Co-interior angles



As angles on a line add up to 180° co-interior angles can also be calculated from applying alternate/ corresponding rules first

Properties of Quadrilaterals

Square
All sides equal size
All angles 90°
Opposite sides are parallel

Rectangle
All angles 90°
Opposite sides are parallel

Rhombus
All sides equal size
Opposite angles are equal

Parallelogram
Opposite sides are parallel
Opposite angles are equal
Co-interior angles

Trapezium
One pair of parallel lines

Kite
No parallel lines
Equal lengths on top sides
Equal lengths on bottom sides
One pair of equal angles

Sum of interior angles

(number of sides – 2) x 180

Interior Angles
The angles enclosed by the polygon

This is an **irregular** polygon – the sides and angles are different sizes

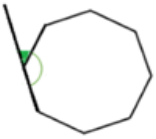
Sum of the interior angles = (5 – 2) x 180

This shape can be made from three triangles
Each triangle has 180°

Sum of the interior angles = 3 x 180
= 540°

Remember this is **all** of the interior angles added together

Missing angles in regular polygons



Exterior angle = 360 ÷ 8 = 45°

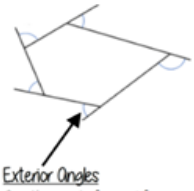
Interior angle = $\frac{(8-2) \times 180}{8} = \frac{6 \times 180}{8}$ = 135°

Exterior angles in regular polygons = 360° ÷ number of sides

Interior angles in regular polygons = $\frac{(\text{number of sides} - 2) \times 180}{\text{number of sides}}$

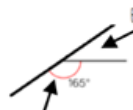
Sum of exterior angles

Exterior angles all add up to 360°



Exterior Angles
Are the angle formed from the straight-line extension at the side of the shape

Using exterior angles



Interior angle + Exterior angle = straight line = 180°
Exterior angle = 180 – 165 = 15°

Number of sides = 360° ÷ exterior angle
Number of sides = 360 ÷ 15 = 24 sides