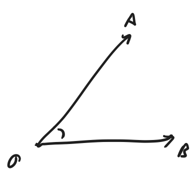
Geometric proofs

Angles

$\angle AOB$



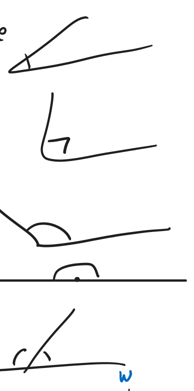
acute

Right

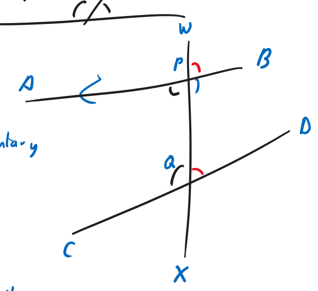
Obtuse

Straight

supplementary



- $AB \parallel CD$
- Alternate angles same
- Cointerior Complementary
- Corresponding equal

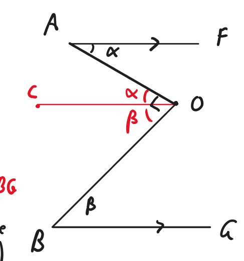


$AB \parallel CD$

$\therefore \angle PQD = \angle APQ = \angle BPW$
$= \angle CQX$

8.

RTP: $\alpha + \beta = 90°$



Let $CO \parallel AF \parallel BG$

$\Rightarrow \angle COA = \angle FAO$ (alternate angles)
$= \alpha$

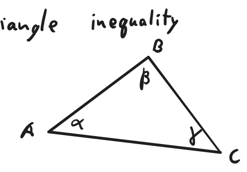
$\angle BOC = \angle OBG$ (alternate angles)
$= \beta$

$\angle AOB = \angle AOC + \angle BOC$
$= \alpha + \beta = 90°$

Q.E.D

Triangles.

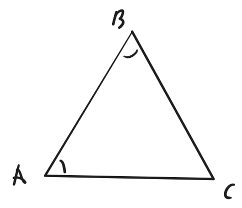
Triangle inequality



$\overline{AB} + \overline{BC} \geq \overline{AC}$

$\alpha + \beta + \gamma = 180°$

Types of triangles
- ↳ equalateral
- ↳ iscoceles
- ↳ scalene

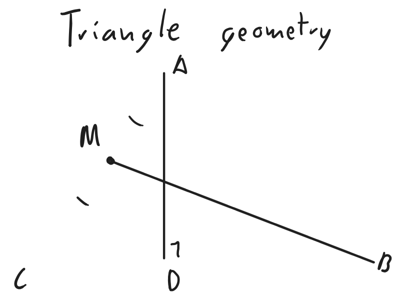


prove $AB = AC$

$\angle BAC = 60°$ (given)
$\angle ABC = 60°$ (given)
$\angle BCA = 60$ (angles in triangle sum to 180°)
$\therefore \triangle ABC$ is equalaterial

$\Rightarrow AB = AC$ (sides of an equalateral triangle)

Triangle geometry

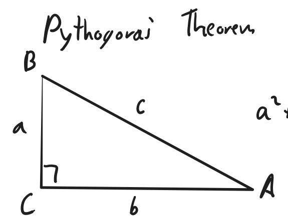


$\overline{AD} \perp \overline{CB}$

$\therefore \overline{AD}$ is an altitude of $\triangle ABC$

$\overline{CM} = \overline{MA}$
$\Rightarrow BM$ is a median of $\triangle ABC$

Pythagoras Theorem



$a^2 + b^2 = c^2$

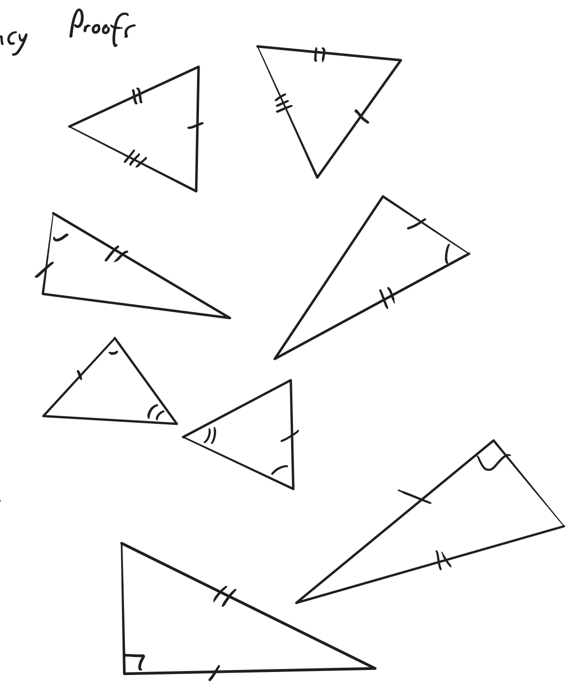
Congruency Proofs

SSS

SAS

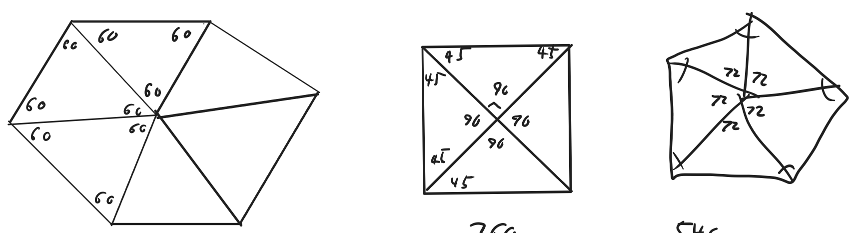
SAA

RHS



Polygons

Angle Sums



interior angles = 720

360

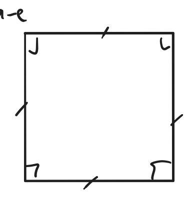
540

- The sum of angles in an n-sided polygon is $(n-2)180$
- The interior angle of an n sided regular polygon is $\frac{(n-2)180}{}$

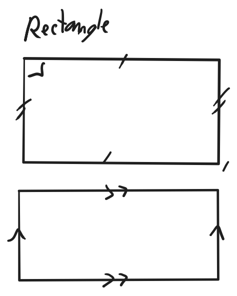
Quadrilaterals

Types
- Square
- Rectangle
- Rhombus
- Parallelogram
- Trapezium

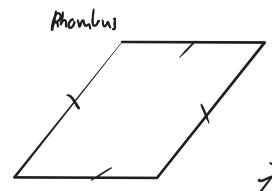
Square



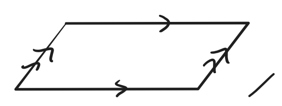
Rectangle

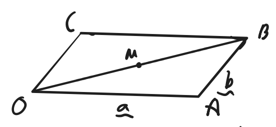


Rhombus



Parallelogram





Let M be midpoint of

$\vec{OB} = \underset{\sim}{a} + \underset{\sim}{b}$

$\vec{OM} = \frac{\underset{\sim}{a} + \underset{\sim}{b}}{2}$

Let N be midpoint of

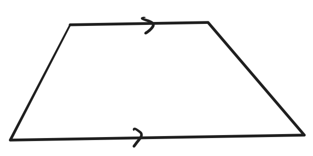
$\vec{AC} = \underset{\sim}{b} - \underset{\sim}{a}$

$\vec{AN} = \frac{\underset{\sim}{b} - \underset{\sim}{a}}{2}$

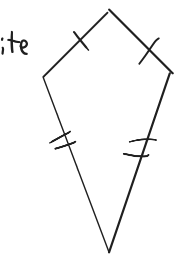
$\vec{ON} = \frac{\underset{\sim}{b} - \underset{\sim}{a}}{2} + a = \frac{b+a}{2}$

$\therefore \vec{ON} = \vec{OM} \therefore$ same point

Trapezium



Kite



Ratios

Divide 300 in the ratio 3:2

Similarity

Two figures are similar if we can enlarge one to be congruent with the other

- lengths have same ratio
- Angle are same

T or F?

All squares are similar.
- True

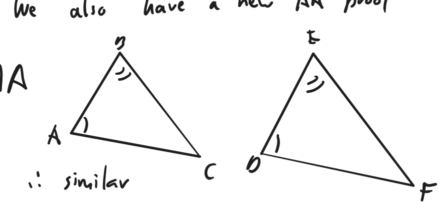
All circles are similar
- True

All line segments are similar
- True

Triangle similarity

Same as congrency by we need to show sides are equal in ratio.
We also have a new AA proof

AA



$\therefore$ similar

S $\overline{AB} = 5\overline{DE}$
S $\overline{AC} = 5\overline{DF}$
S $\overline{BC} = 5\overline{EF}$

$\therefore \triangle ABC \cong \triangle DEF$ (difference of scale factor 5)