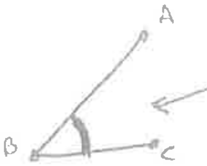
GEOMETRY (SPACE / SHAPES / ANGLES / LINES)

ANGLES



THIS CAN BE WRITTEN AS $\angle ABC$

OR

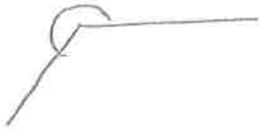
$\angle B$

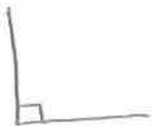
TYPES OF ANGLE :

ACUTE

OBTUSE

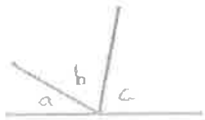
REFLEX





RIGHT - ANGLE = 90° = PERPENDICULAR

STRAIGHT LINE = 180°

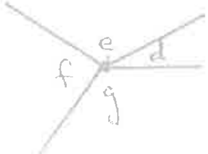


ALL ANGLES WHICH MAKE UP A STRAIGHT LINE ADD UP TO 180°

$a + b + c = 180^\circ$

QUESTIONS :

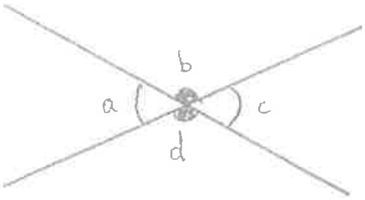
PLAY FIND THE STRAIGHT LINE



ALL ANGLES AT A POINT WHICH MAKE UP A FULL CIRCLE ADD UP TO 360°

$d + e + f + g = 360^\circ$

QUESTIONS WITH ANGLES



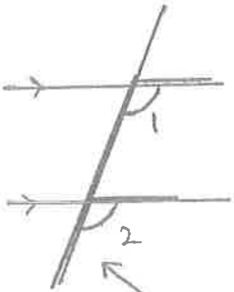
$a = c$

$b = d$

VERTICALLY OPPOSITE

LOOK FOR X

IF TWO LINES ARE PARALLEL:

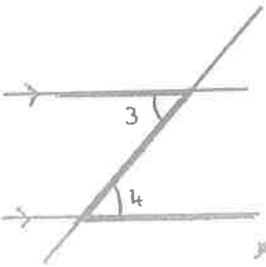


THESE ANGLES ARE **CORRESPONDING**

$|\angle 1| = |\angle 2|$

LOOK FOR F SHAPE

THIS LINE (CROSSING PARALLEL LINES) IS CALLED A "TRANSVERSAL"



THESE ANGLES ARE **ALTERNATE**

$|\angle 3| = |\angle 4|$

LOOK FOR Z SHAPE

SOME "WORDS" / TERMS

AXIOM = "FACT" – WE ACCEPT WITHOUT PROOF

THEOREM = FACT THAT CAN BE PROVED

TRIANGLES

ALL 3 ANGLES ADD UP TO 180°

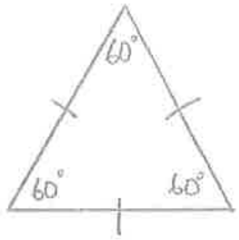
$\angle 1 + \angle 2 + \angle 3 = 180°$

TYPES OF TRIANGLE

EQUILATERAL

ALL 3 SIDES ARE THE SAME

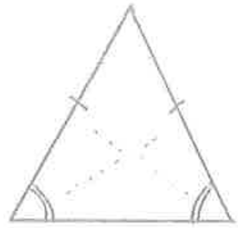
ALL 3 ANGLES ARE THE SAME (60°)



ISOSCELES

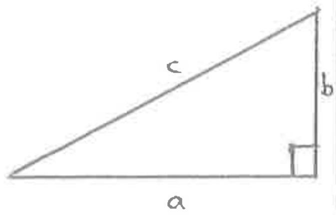
2 EQUAL SIDES

2 EQUAL ANGLES



DON'T MIX THESE UP ⟷

RIGHT - ANGLED



1 ANGLE OF 90°

OTHER 2 ANGLES HAVE TO ADD UP TO 90°

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

↑ HYPOTENUSE

A TRIANGLE WHICH IS NOT ANY OF THE OTHER 3 TRIANGLES IS CALLED A

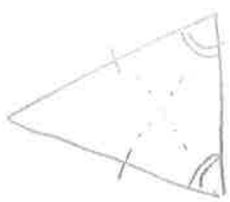
SCALENE TRIANGLE

THE ONLY INTERESTING THING ABOUT A SCALENE TRIANGLE IS THAT THERE'S NOTHING INTERESTING ABOUT SCALENE TRIANGLES.

REMEMBER AN ISOSCELES TRIANGLE CAN BE DRAWN FACING ANY DIRECTION ... THEY MIGHT BE TRYING TO TRICK YOU.

IT IS THE TWO ANGLES WHICH ARE OPPOSITE THE TWO EQUAL SIDES WHICH ARE EQUAL

eg



OR

OR

PARALLELOGRAMS

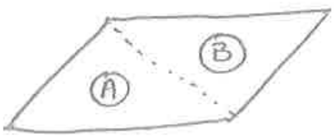
HAS:
- FOUR SIDES
- OPPOSITE SIDES ARE EQUAL LENGTH + PARALLEL.
- OPPOSITE ANGLES ARE EQUAL

DIAGONALS ACROSS PARALLELOGRAMS ARE VERY INTERESTING

- DIAGONALS "BISECT" THE AREA

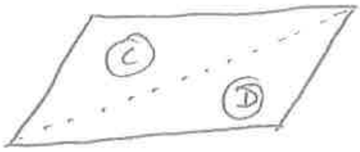
BISECT MEANS "CUT IN HALF"

eg



AREA A = AREA B

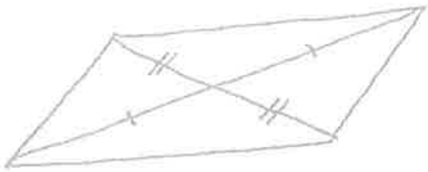
OR



AREA C = AREA D

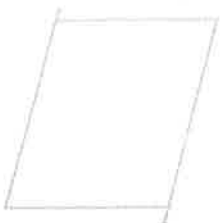
- DIAGONALS ALSO BISECT EACH OTHER

eg



DON'T GET CONFUSED BY "TALL" PARALLELOGRAMS!

eg



THEY WORK THE SAME WAY!

CONGRUENT TRIANGLES

CONGRUENT = IDENTICAL

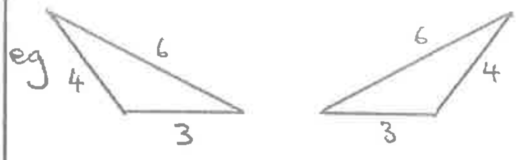
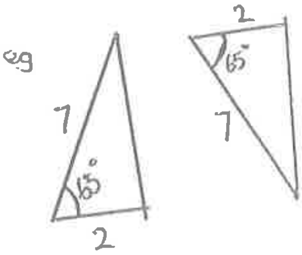
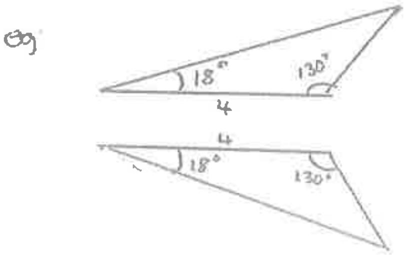
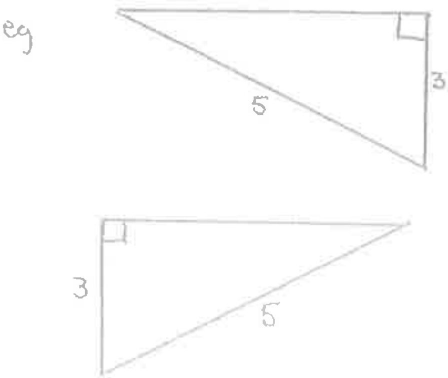
TRIANGLES ARE CONGRUENT IF :

4 WAYS
- S.S.S
- S.A.S
- A.S.A.
- R.H.S

NOT A.A.A. ← DON'T MAKE THIS MISTAKE !

THIS IS SIMILAR

WHY ARE THEY CONGRUENT ?

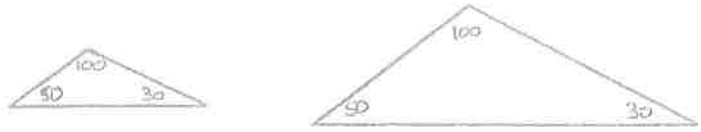
S.S.S.	IF ALL THREE SIDES ARE THE SAME LENGTH	
S.A.S.	IF 2 SIDES AND THE ANGLE IN-BETWEEN NOT JUST ANY ANGLE	
A.S.A.	2 ANGLES AND THE SIDE IN-BETWEEN	
R.H.S.	IF BOTH TRIANGLES HAVE A RIGHT-ANGLE, THE SAME HYPOTENUSE LENGTH AND ONE OTHER SAME SIDE	

SIMILAR TRIANGLES (NOT THE SAME AS CONGRUENT)

[SAME ANGLES]

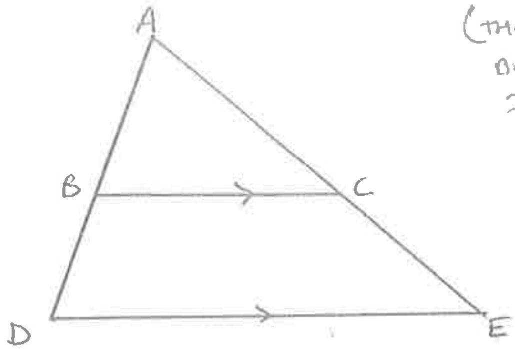
SIMILAR TRIANGLES ARE LIKE A LARGER / SMALLER VERSION OF EACH OTHER.

eg



THESE CAN BE DRAWN ONE INSIDE THE OTHER:

(THESE ARE OFTEN TREATED DIFFERENTLY, BUT ACTUALLY THEY ARE JUST 2 SIMILAR TRIANGLES)

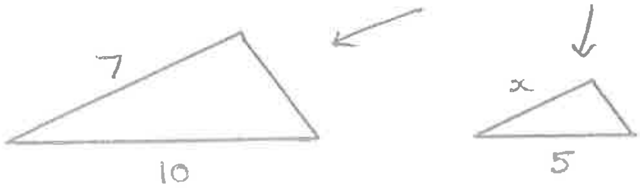


$\triangle$ ABC AND $\triangle$ ADE HAVE THE SAME ANGLES, SO ARE SIMILAR TRIANGLES.

THEOREM THE CORRESPONDING SIDES OF SIMILAR TRIANGLES ARE IN THE SAME RATIO *

WE USE THIS TO WORK OUT LENGTHS OF SIDES.

SIMILAR TRIANGLES



* "FRACTIONS" AND "RATIOS" ARE ESSENTIALLY THE SAME

WRITE DOWN AN EQUATION WITH

"UNKNOWN" FRACTION = KNOWN FRACTION

eg $\frac{x}{5} = \frac{7}{10}$

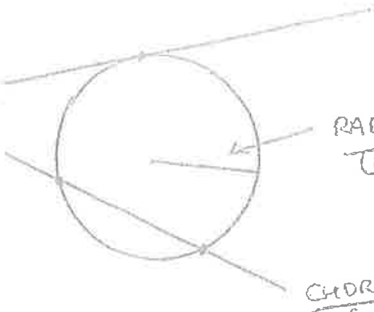
THESE SIDES MUST BE THE ONES THAT CORRESPOND TO THE "UNKNOWN" SIDES

THEN SOLVE

$10x = 35$

$x = 3.5$

CIRCLES



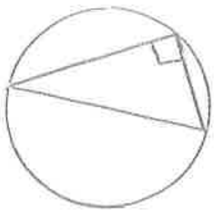
TANGENT (TOUCHES CIRCLE AT ONE POINT)

LEARN THESE WORDS

RADIUS (LENGTH FROM CENTRE TO ANY POINT OF THE CIRCLE)

DIAMETER (TWICE LENGTH OF RADIUS)

CHORD (LINE THAT CUTS/TOUCHES CIRCLE AT TWO POINTS)



THE ANGLE IN A SEMI-CIRCLE IS A RIGHT ANGLE

QUESTIONS WITH CIRCLES AND TRIANGLES

LOOK FOR : SEMI - CIRCLES

- BECAUSE THE ANGLE IN A SEMI CIRCLE IS 90° (RIGHT ANGLE)

RADII (OR RADIUSES)

- BECAUSE IT WILL HELP US FIND ISOSCELES TRIANGLES.

ISOSCELES TRIANGLES

- BECAUSE ANGLES AT THE BASE ARE THE SAME.

RIGHT-ANGLED TRIANGLE

- BECAUSE THEN I CAN WORK OUT THE SIDE-LENGTHS USING PYTHAGORAS $a^2 + b^2 = c^2$