Geometry - Angles

Naming Angles

* We use three letters.
* The vertex goes in the middle.
* Start with the letter that is first in the Alphabet.

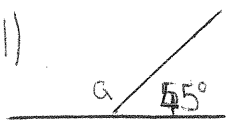
14th Feb, Tues

Angle Rules

Do <u>not use</u> protractor

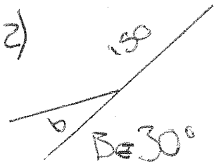
A) Angles on a straight line add too 180°

eg 1)



a = 135

2)



b = 30°

New words

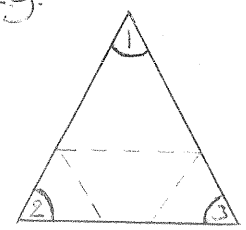
Complementary - Add to 90°
eg - 40° & 50°

Supplementary - Add to 180°
eg 20° & 160°

1. Cut of paper triangle
2. fold angles on baseline
3. Glue into workbooks
4. Notes. (Notebook)

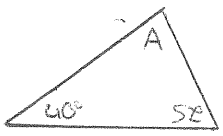
B) Angles in a triangles
Angles in a triangle Add to 180°

eg.



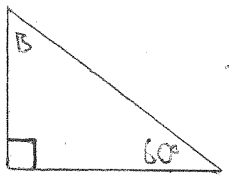
1+2+3 = 180°

eg.1) ~~Find~~ find value of A



A = 88°

2) find Angle B

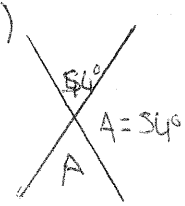


B = 30

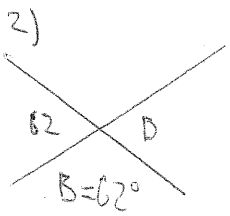
C) Vertically opposite Angles

Vertically opposite Angles are equal

eg.1)



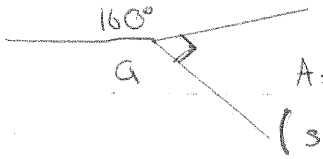
2)



Angles at a point

Angles at a point ~~Stick~~
Add to 360°

eg

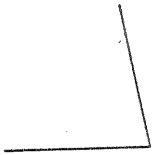


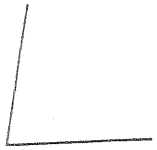
A = 110°
(since 160° + 90° + 110° = 360°)

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

$\frac{15}{20} + \frac{4}{20}$ $\frac{19}{20}$

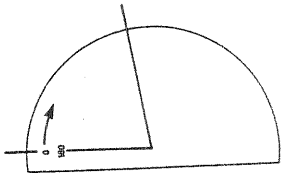
Measuring angles



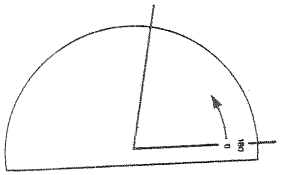


Here are two angles. You will see that the angles are at different ends of the baseline.

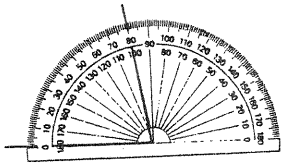
When we place the protractor on the angle, we will use the set of numbers that start at 0°.



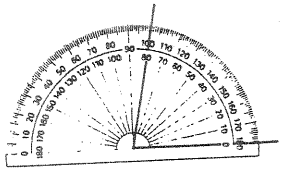
Start at 0°
Not at 180°



Start at 0°
Not at 180°



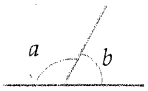
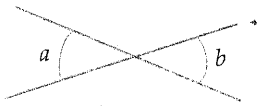
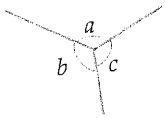
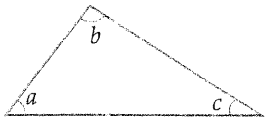
An angle of 80°



An angle of 80°

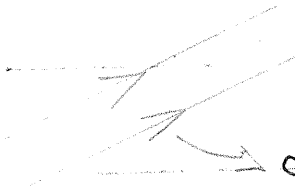
Some rules for finding angles

In Maths it is often important to explain your results. Here are some angle reasons covered already:

	Reason	Abbreviation
$a + b = 180°$ 	adjacent angles on a straight line add to 180°	∠'s on line
$a = b$ 	vertically opposite angles are equal	vert. opp. ∠'s
$a + b + c = 360°$ 	angles at a point add to 360°	∠'s at pt
$a + b + c = 180°$ 	angles in a triangle add to 180°	∠ sum of Δ

Parallel lines

Parallel lines do not meet they remain the same distance apart



arrow shows Parallel

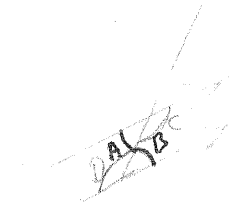
Angle

1) Examples

Find the

reasons

are equal (vert opp ∠s equal)



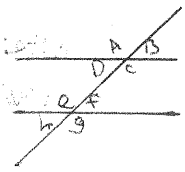
A and B

Examples

2)

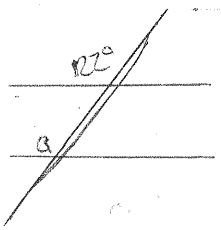
22/2 Corresponding Angles

corresponding angles between parallel lines are equal



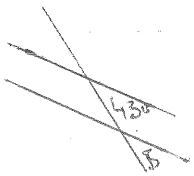
pairs of corresponding angles are A&E, D&h b&F, C&G

1)



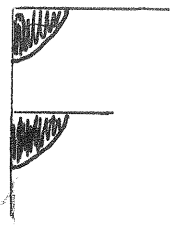
A= 122° (corresp L's equal)

2)

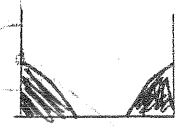


B= 43° (corresp L's equal)

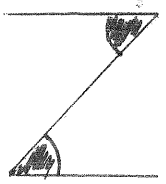
Memory aid



corresponding



cointerior



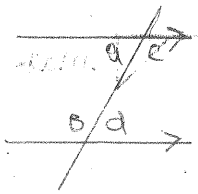
Alternate

Grad. notes Lion

27/2 Bearings

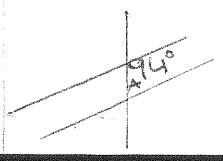
CCO-interior Angles

co-interior angles between parralel lines add to 180°



pairs of co-interior Angles a&b, c&d

Example

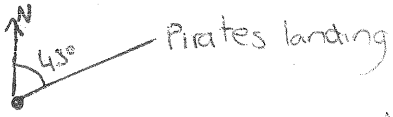


A= 86° (co-interior L's Add to 180°)

Bearings are angles. Bearings are measured clockwise from north. North is generally up the page

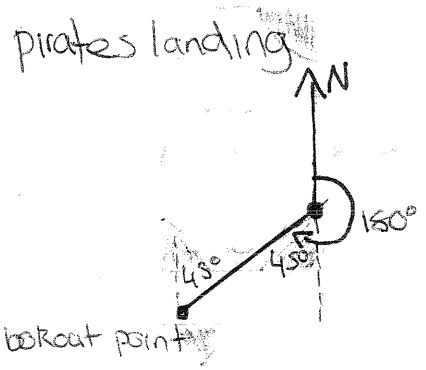
1) Example

Find the bearing of pirates landing from the lookout on desolation is



bearing is 045° (uses 3 digits)

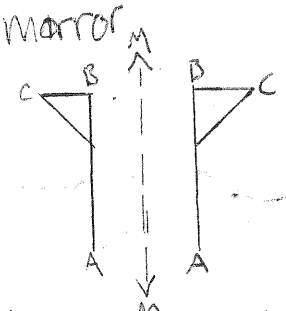
2) Find the bearing of look-out point from pirates landing



Bearing is $180° + 45° = 225°$

7/3 Reflection

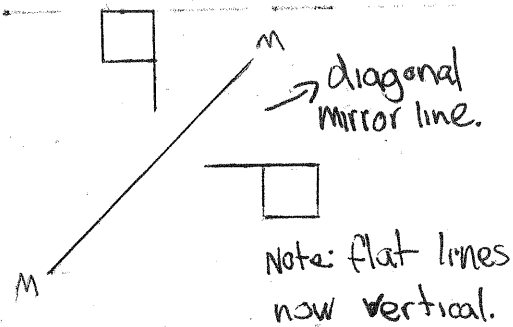
In a reflection an object and its image are on opposite sides of the mirror



the mirror line is an <u>axis of symmetry</u>

The flags point in opposite directions (sense is <u>reversed</u>)

Example



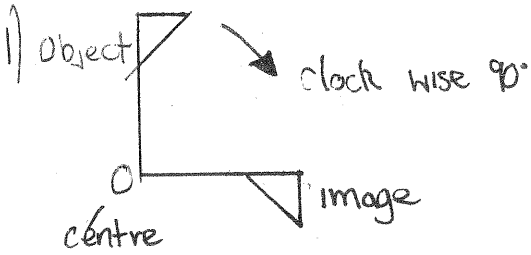
Rotation

To describe a rotation we need

* A centre
* A angle
* direction (clockwise o Anti clockwise

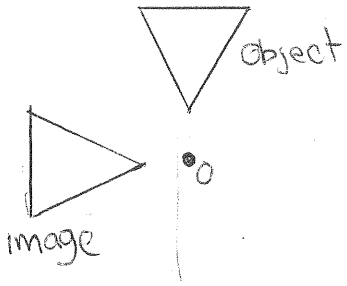
<u>Positive</u> direction is <u>Ant clockwise</u>

Example



A rotation of 180° will l the same no matter clock or anticlockwise

2)



Rotation of 90° anticlockwise about O.

Translation

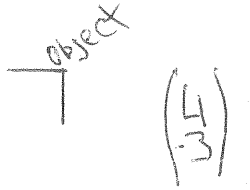
A translation is a side. Every point move the same distance in the same direction. We can show a translation with a vector.

eg. 1 $\begin{pmatrix}2\\4\end{pmatrix}$ → 2 right, 4 up

eg 2 $\begin{pmatrix}0\\-3\end{pmatrix}$ → 3 down only

eg 3 $\begin{pmatrix}-1\\0\end{pmatrix}$ → back one (left) only

eg



$\begin{pmatrix}4\\-3\end{pmatrix}$

Image

Translation of 4 units (squares) to right and 3 down.

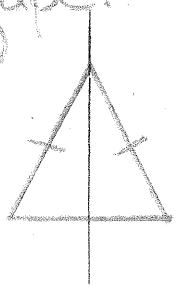
Symmetry

Shapes may have 2 types of symmetry, line symmetry & rotation symmetry.

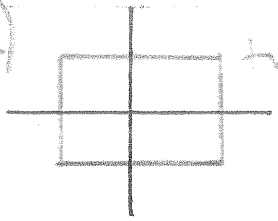
Line Symmetry

When a mirror line (axis of symmetry) can be drawn through a shape.

eg. 1)



eg 2)



two types of Symme

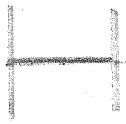
Rotation symmetry

When a shape can be rotated more than once onto itself before returning to its starting point it has rotation symmetry.

Point

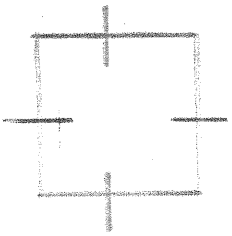
All shapes have at least order 1 rotation symmetry

e.g. 1)



rotational symmetry 2

e.g 2)

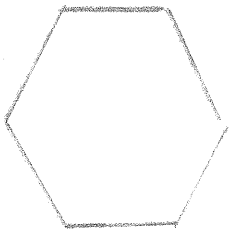


Square, rotational symmetry 4

Point regular shapes

Rotational symmetry equals the number of sides

e.g. regular hexagon



rotation symmetry 6

total order of symmetry

add together the line and rotation symmetry

eg

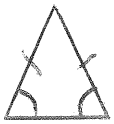
line symmetry = 2
Order rotation symmetry = 2
total order symmetry = 4

19/3 Notes

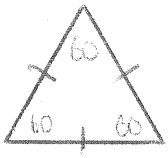
Names of triangles

Scalene
all angles and sides different
eg

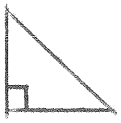
Isosceles
two sides are the same
eg



Equilateral
all sides the same. All angles add to 60° eg.



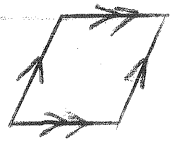
Right angle
has a 90° angle
eg.

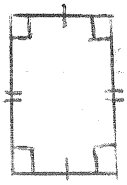


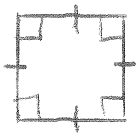
Polygons (straight sides)

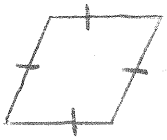
3 sides - triangle
4 sides - quadrilateral
5 sides - pentagon
6 sides - hexagon
8 sides - octagon

Special quadrilaterals

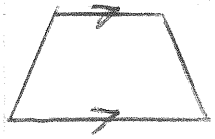

parallelogram


rectangle


square


rhombus


Rite


trapezium