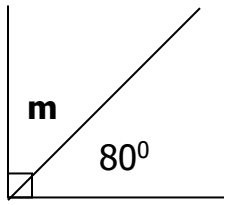
P.5 Geometry

Review of P.4 work on geometry (supplementary and complementary angles)

1. What are complementary angles and supplementary
2. What are supplementary angles?
3. What is the complement of a) 86^0 b) 40^0
4. What is the supplement of 120^0
5. Two complementary angles are x and 43^0. What is the value of x.
6. 3y and 60^0 are supplementary angles. Find the value of y.

Work out the value of the missing angles below.

1.



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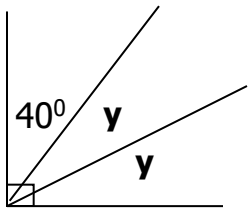

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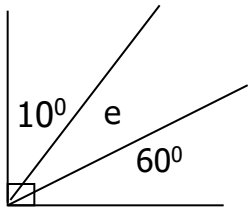

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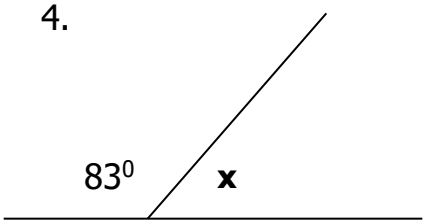

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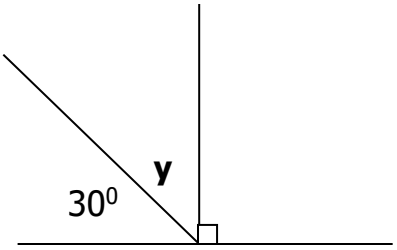

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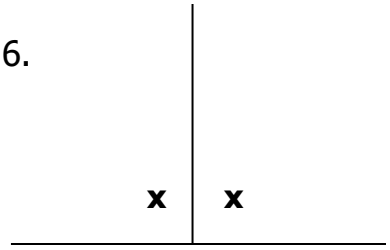

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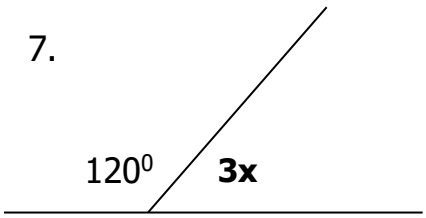

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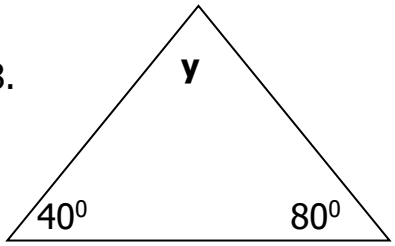

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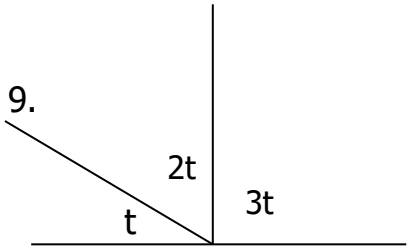

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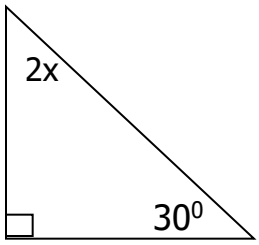

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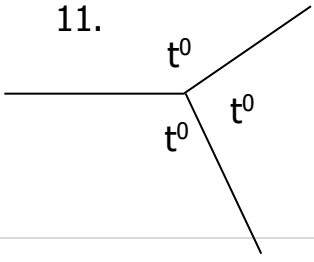

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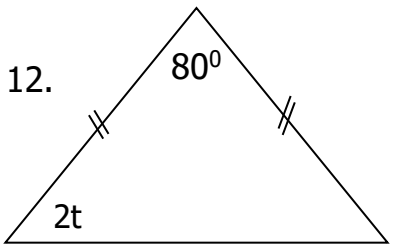


REFERENCE:

- MK Bk. 5, Page 199 - 201
- MK BK. 7 page 202 – 205
- Fountain BK. 5 Page 206 – 208

Review: measuring and drawing angles. (Between 0 and 180^0)

A protractor:

A protractor is an instrument used to measure angles in degrees. It is divided into 180 small units. Each unit is called a degree. A protractor has an inner scale and an outer scale. The inner scale reads from right to left and the outer scale reads from left to right.

NB. There is a line segment which passes through the centre point of the protractor and joins the zeros of the two scales.

Measuring angles

Hint : Procedure.

1. Place the centre point on the vertex of the angle.
2. Adjust the line segment joining the zeros of the scales to fall on top of the arms of the angle.
3. The measure of the angle is given by the mark where the other arm crosses the scale.

Note: Different angles will be drawn and photocopied for each child to measure and label the angles.

Drawing angles using a protractor.

Procedure

1. Draw a line and on it mark a point A.

2. Place the protractor on the line so that the centre point comes on A and the line passes through the Zero marks of inner and outer scales. Mark a point.
3. Remove the protractor and draw a line from point A to the marked point.

REFERENCE:

- MK Bk. 5, Page 194.
- Primary level mathematics Bk. 6, 7 and 8 page 54 – 55.

Names of polygons

Name of polygon	**No. of sides**
Triangle	3
Quadrilaterals	4
Pentagon	5
Hexagon	6
Heptagon / Septagon	7
Octagon	8
Nonagon	9
Decagon	10
Nuo – decagon	11
Duo – decagon	12

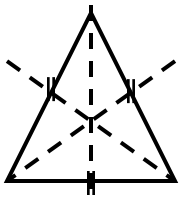
Lines of symmetry

NB.

1. A line of symmetry divides a figure or an object into 2 equal parts such that when folded, the parts do not overlap but cover each other completely.
2. All regular polygons have the same number of lines of symmetry as the sides of the polygon.

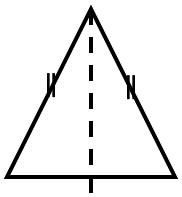
A. TRIANGLES

1. Equilateral triangle



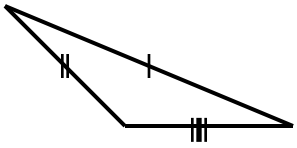
3 lines of symmetry.

2. Isosceles triangle



1 line of symmetry

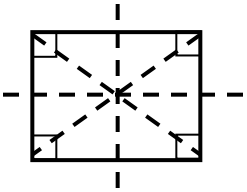
3. Scalene triangle



No line of symmetry

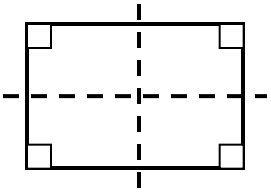
B. QUADRILATERALS

1. Square



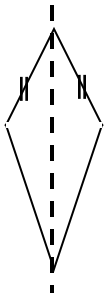
4 lines of symmetry

2. Rectangle



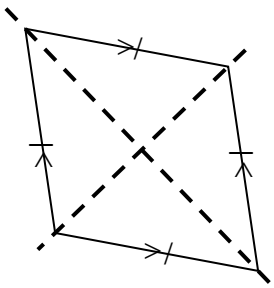
2 lines of symmetry

3. Kite



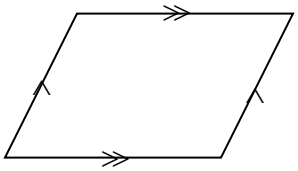
1 line of symmetry

4. Rhombus



2 lines of Symmetry.

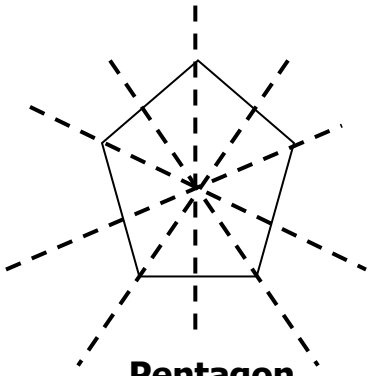
5. Parallelogram



No line of symmetry.

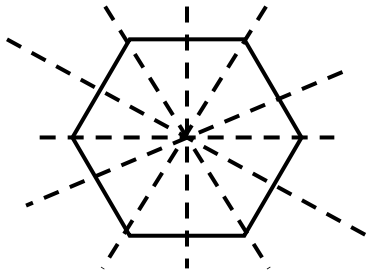
C. OTHER (REGULAR) POLYGONS.

Example : A regular pentagon and regular hexagon.



Pentagon

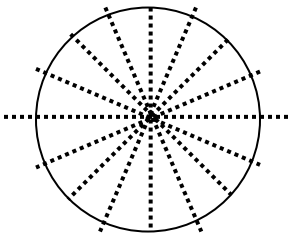
5 lines of symmetry



Hexagon

6 lines of symmetry etc.

D. THE CIRCLE

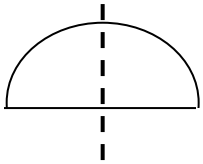


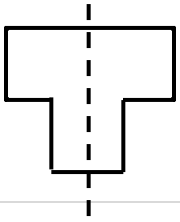
Has very many lines of symmetry

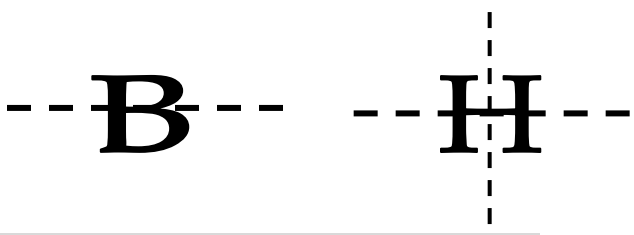
OR Has an infinite number of lines of symmetry.

NB: Hint on other shapes and letters.

Example



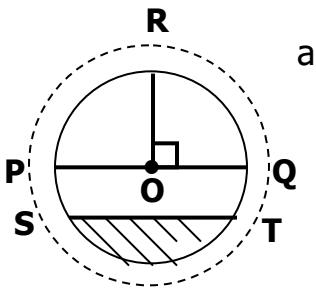




REFERENCE : - Understanding MTC Book 5 page 190 – 191
- MK New edition page 185.

Review : The Circle

A. Parts of a circle



a) Name the lines:

i) $\overline{RO}$ = _____

ii) PQ = _____

iii) ST = _____

iv) PSTQR = _____

NB: i) Half of a circle is called a _____

ii) A quarter if a circle is called a _____

iii) The total distance around a circle is _____

B. Drawing circles

i) Using a pair of compasses and a ruler only, construct circles given radii.

a) 3cm b) 3.5cm c) 5cm etc.

ii) Using a pair of compasses and a ruler, construct a circle given diameter.

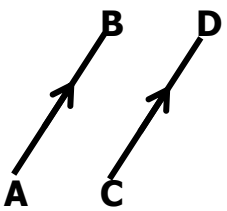
Note : Hint on the proper calculation of radius and diameter given different units of measurement of wholes and decimals.

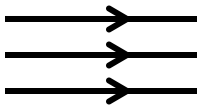
REFERENCE: - Primary Mathematics B. 6, 7, and 8 pg. 64.
- MK Bk. 5 pg 186
- Functional mathematics Book 5 page 203 – 4.

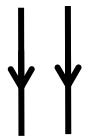
Parallel lines

These are lines which do not meet.

- They always remain the same distance apart at every point.
- They don't intersect when produced in either direction.
- They are shown with arrow head.







AB is parallel to CD.

Using symbols AB // CD

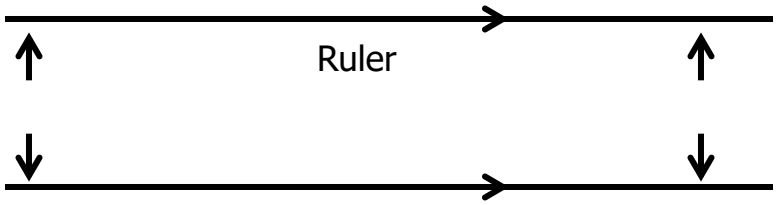
Drawing Parallel lines

A) Using a ruler and a pencil.

i) Suspend the ruler on the flat surface (book)

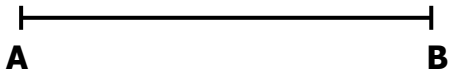
ii) Without the ruler moving – Use a pencil to draw lines on the two straight edges of the ruler.

iii) Remove the ruler – the two lines are parallel.

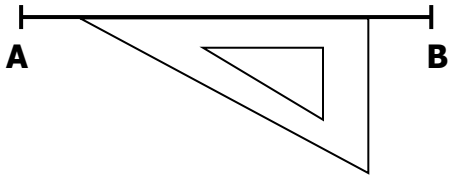


B) Using a ruler and a set square.

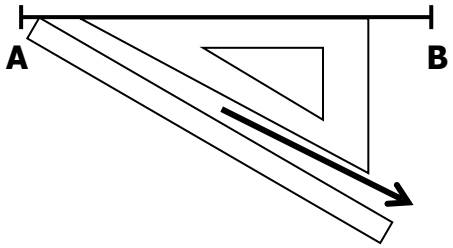
Step I: Given the line AB



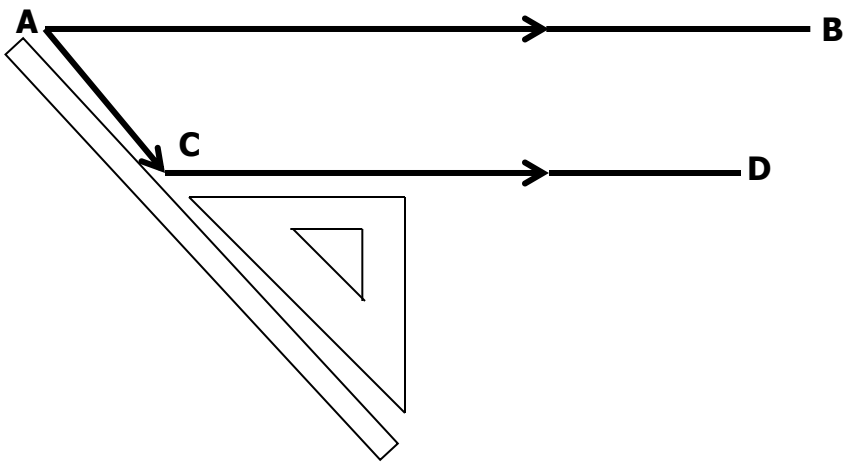
Step II: Place a set square along line AB.



Step III: Place a ruler along the hypotenuse side of the sets square.



Step IV: Drag the set square downwards along the ruler.



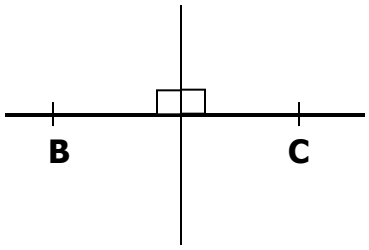
Step V: Draw a line CD on top of the set square
AB is parallel to CD.

REFERENCE:
- Understanding maths Book 5 page 187
- MK Bk. 5 page 177
- Supplementary Maths Bk. 6, 7 and 8 page 56.

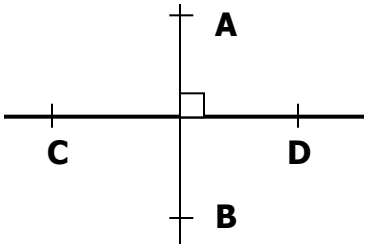
Perpendicular lines

These are lines that meet at a right angle (90^0)

Using a pencil and a set square.



In the figure below AB is perpendicular to CD.



Using symbols : AB ⊥ CD

Constructing perpendicular lines

Constructing a perpendicular line a t a point.

Example

Given a line marked ABC shown. Construct a perpendicular line at B.

Constructing a perpendicular line a t a point.

Using a ruler and a pair of compasses. Construct the following angles.

1. 60^0 2. 90^0

3. 120^0

Bisecting angles

Bisect the following angles

Note: Bisecting an angle or line means dividing it into two equal parts.

Bisect the following angles.

Example: Bisect the reflex VOT.

Angles constructed by bisecting

a) 30^0

b) 45^0

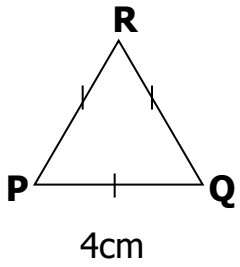
c) 135^0

150^0

Constructing a triangles of given sides. (SSS)

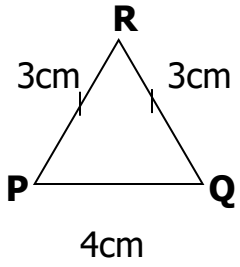
Example : Using a ruler and pair of compasses construct an equilateral triangle PQR with side 4cm.

Sketch



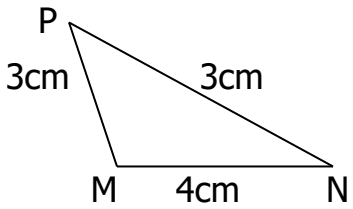
Example : Construct an Isosceles triangle of side 4cm, 3cm, 3cm.

Sketch



Example : Construct a scalene triangle MNO of 4cm, 3cm, and 5cm.

Sketch



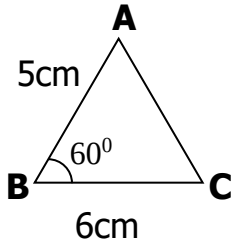
Activity

1. Construct an equilateral triangle ABC whose one side is a) 5cm b) 3.5cm
2. Construct an isosceles triangle PQR such that PQ = PR = 4cm .
3. Construct a triangle such that AB = 6cm, AC = 5cm and BC = 4cm.

Constructing a triangle given one angle : (SAS)

Example : Using a pair of compasses and a ruler only, construct a triangle ABC such that BC = 6cm, AB = 5cm and $\angle ABC = 60^0$.

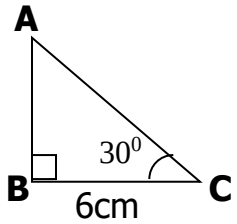
Sketch



Constructing a triangle given two angles and one side.

Example : Construct a triangle ABC where line AB = 6cm, $\angle A = 90^0$. $\angle B = 30^0$.

Sketch

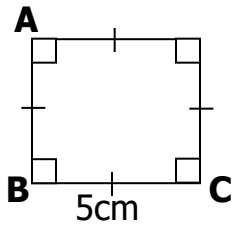


REFERENCE: MK BK. 7 pages 263 - 264

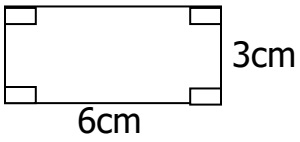
Constructing squares and rectangles..

Example : Using a pair of compasses, construct a square of 5cm.

Sketch

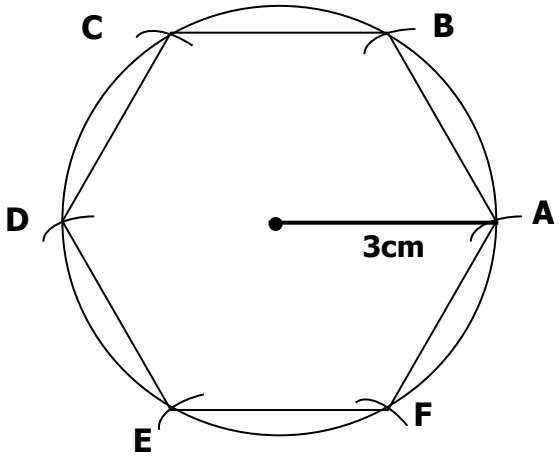


Example: Using a ruler, pencil and a pair of compasses only. Construct a rectangle ABCD of length 6cm and width 3cm.



Constructing of Hexagon

Example : Construct a hexagon with side 3cm.

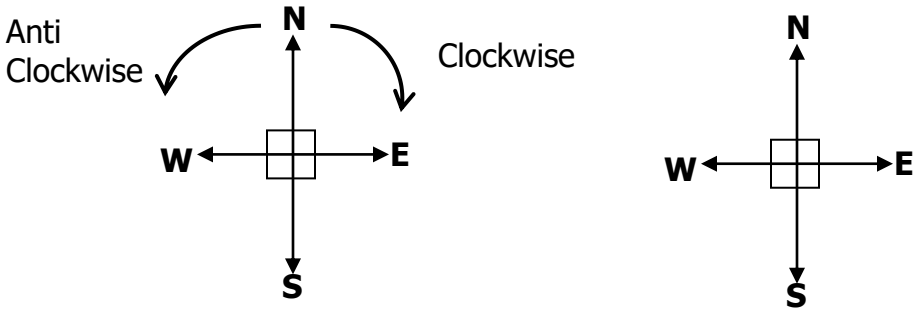


REFERENCE: MK BK. 7 pages 271 – 273.

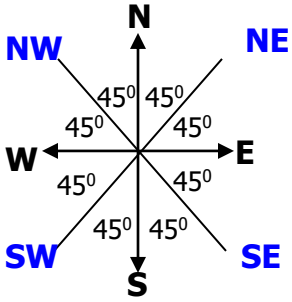
Rotations and Compass directions.

A rotation is a change carried out on a fixed point and is described by giving the angle and directions of the turn.

Rotations can be anticlockwise or clockwise.



NB. The major cardinal points are further sub – divided.

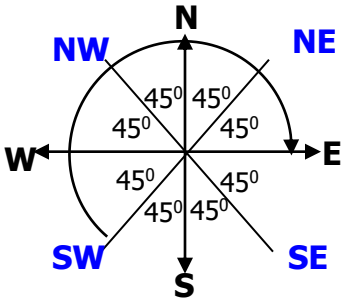


NB: A quarter turn = $\frac{1}{4}$ x 360^0 = 90^0

A half turn = $\frac{1}{2}$ x 360^0 = 180^0

Example 1: John was facing South and turned clockwise to face East. Through what angle did he turn?

Solution



S ⟶ W = 90^0 OR 90

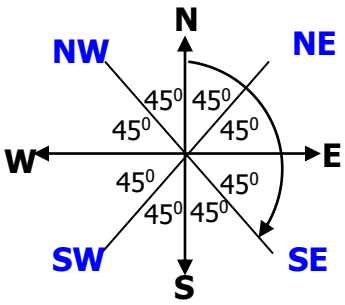
W ⟶ N = 90^0 X 3

N ⟶ E = $+90^0$ **270^0**

270^0

Example 2: Okot was facing North and turned through an angle of 135^0. What will be his new direction?

Solution



NB = 135 – 90

= 45^0

Also: 45 + 45 + 45 = **135^0**

He will be facing South East.

REFERENCE: MK BK 5 page 190 – 192.