# LEGIT EDUCATION CONSULTANT

## P.7 MATHEMATICS

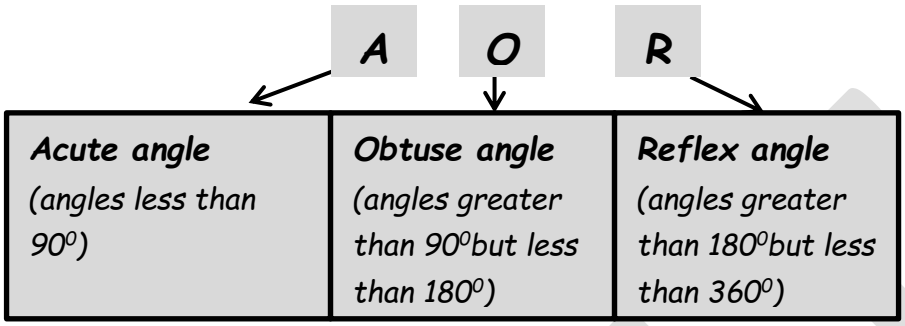
## LESSON NOTES AND ACTIVITIES

# ISSUE 3

**NAME:----------**

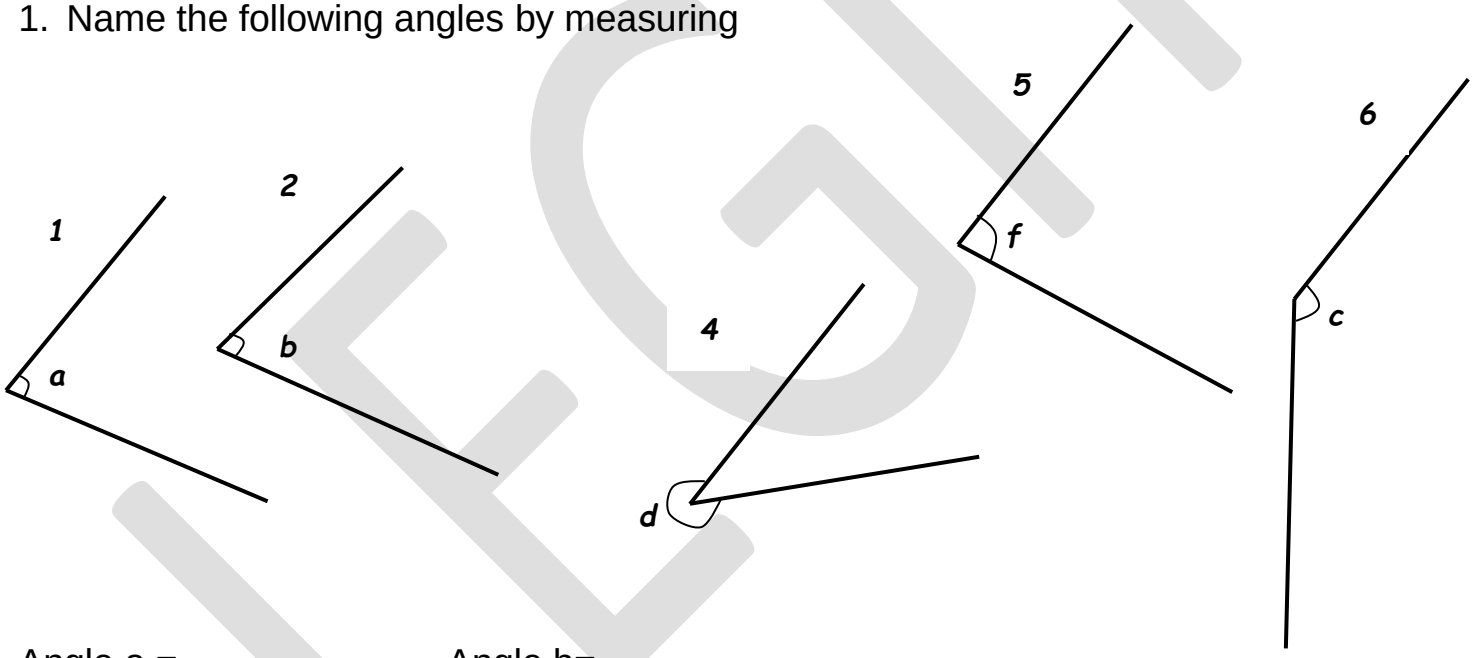
## LINES, ANGLES AND GEOMETRIC FIGURES

In this topic we shall majorly look at angles and let us begin by introducing to you an Acronym AOR (Any Other Relations) meaning:




### Activity

1. Name the following angles by measuring

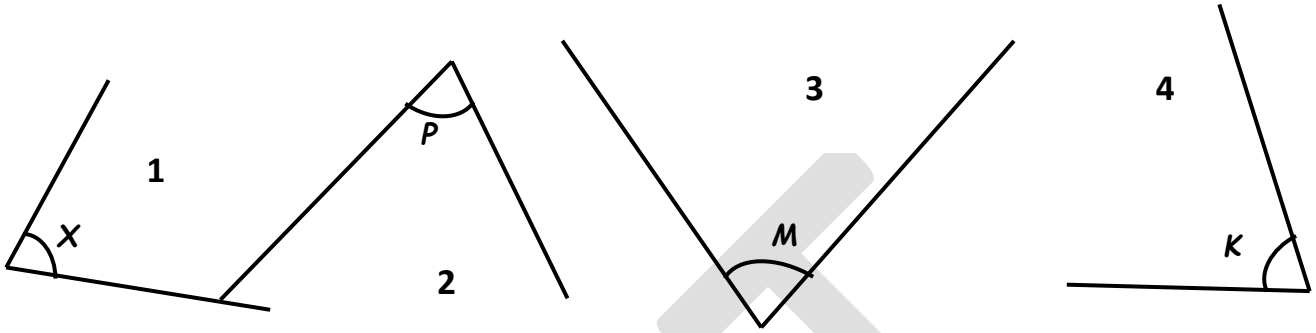



Angle a =_____, Angle b=_____

Angle c=_____, Angle d=_____,

Angle f=_____

2. Use a protractor to measure the following angles:




3. Use a protractor to draw the following angles:

a) $80^0$

b) $100^0$

c) $45^0$

d) $30^0$

e) $130^0$

f) $50^0$

g) $75^0$

h) $15^0$

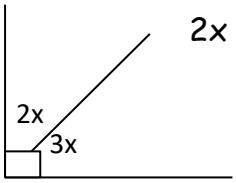
i) $115^0$

**We also have the categories of angles which are not in the "AOR" group i.e. the complementary and supplementary angles**

### Complementary angles (Angles that add up to $90^0$)

**Complementary angles**

**1**. Find x




$2x + 3x = 90^0$

$\frac{5x}{5} = \frac{90^0}{5}$

$X = 18^0$

2. Two Complementary angles are $2(p+20^0)$ and $p+20^0$, find p

$2(p+20^0) + p + 20^0 = 90^0$

$2p + 40^0 + p + 20^0 = 90^0$

$3p + 60^0 = 90^0$

$3p + 60^0 - 60^0 = 90^0 - 60^0$

$3p = 30^0$

$\frac{3p}{3} = \frac{30^0}{3}$

$P = 10^0$

**3**. Find the complement of $m + 40^0$

Comp = $90^0$- (*GA*)

= $90^0$-(m + $40^0$)

= $90^0$-m-$40^0$

= $50^0$-m

***Note:***
***GA = Given Angle***

**4**. What angle is $\frac{1}{4}$ of its complement?

| Angle | Compl. | total |
|---|---|---|
| 1 | 4 | 1+4=5 |
| ? | ? | $90^0$ |

*In these questions, it's easier to use ratios and parts*

5 parts rep. $90^0$

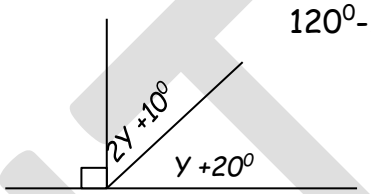
1 part reps. $\frac{180^0}{5}$

1 part rep $18^0$

1 part reps. $18^0$ = $18^0$

### Supplementary angles (Angles that add up to $180^0$)

1. Find the value of y




$90^0+2y+10^0+y+20^0 = 180^0$

$120^0 + 3y = 180^0$

$120^0-120^0 + 3y = 180^0 - 120^0$

$3y = 60^0$

$\frac{3y}{3} = \frac{60^0}{3}$

$Y = 20^0$

**2**. Find the complement of $p + 38^0$

Complement = $90^0$- (*GA*)

*GA* = given angle

= $90^0$-(p+$38^0$)

=$90^0$-p-$38^0$

= $90^0$ -$38^0$-p

=$52^0$-p

**3**. Find the supplement of $70^0$ – n

Supplement = $180^0$- (*GA*)

*GA* = given angle

= $180^0$-($70^0$-n)

= $180^0$-$70^0$+n

= $110^0$ + n

**4**. What angle is 5 times its supplement?

Let the suppl. be r

| suppl | angle | total |
|---|---|---|
| r | 5r | 6r |
| ? | ? | $180^0$ |

$5r + r = 180^0$

$6r = 180^0$

$\frac{6r}{6} = \frac{180^0}{6}$

$r = 30^0$

Therefore the angle = 5 x $30^0$

= $150^0$

## ACTIVITY

1. Two complementary angles are $40^0$ and 2p. find the value of p.

2. Angles in a right angle are k, 2k, 3k and 4k. find the value of k.

3. Find the complement of $38^0$

4. Two complementary angles are $3(k+10^0)$ and $30^0$. Find the value of k.

5. Find the complement of $24^0$ +k

6. Find the complement of $55^0$ – y.

7. Three supplementary angles are 3m, 2m and $60^0$. Find the value of m.

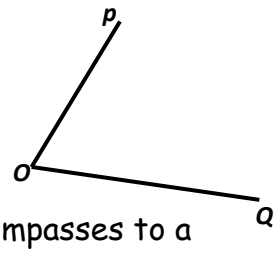
8. Find the supplement of $68^0$.

9. What is the supplement of $20^0$+ g?

10. What is the supplement of $78^0$ -n?

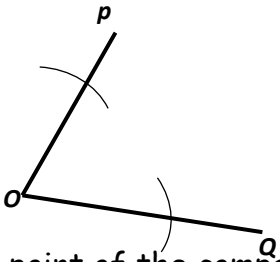
## Bisecting Angles

Bisecting is the dividing of an angle into exactly two equal parts.
In most cases we use pair of compasses to bisect
Example:
Use a pair of compasses to bisect the given angle below

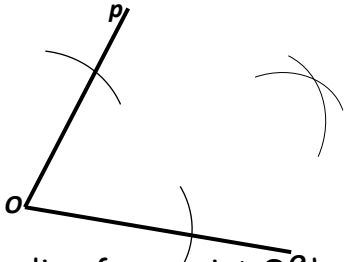



***Procedures***

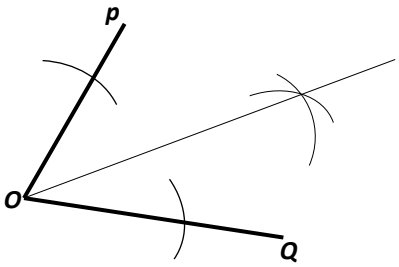
Adjust a pair of compasses to a reasonable radius and put the sharp point of the compass at point O
Make arcs one on line PO and another one on line QO




Put the sharp point of the compass at the meeting point of the arc and the line and make other meeting arcs

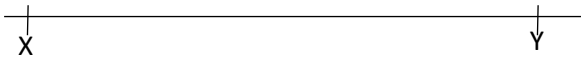



Draw a line from point O through the meeting arcs



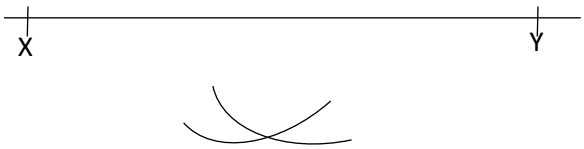

**Bisecting lines / constructing perpendicular bisectors**

Given line XY



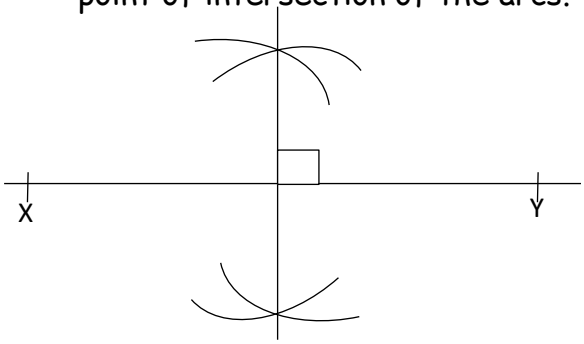

Put the sharp point of the compass at x and adjust it to Y


Draw intersecting arcs up and down the line XY



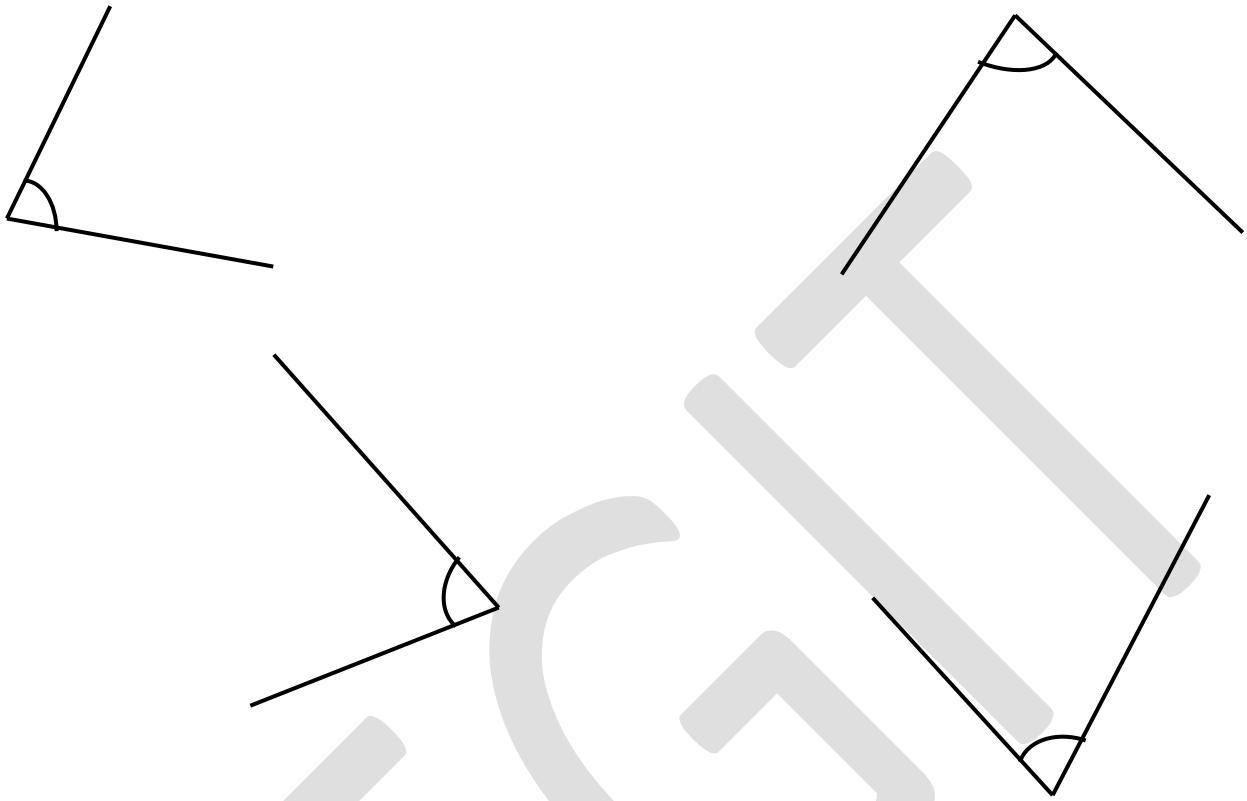

Mark the point of intersection

Draw a line passing through the point of intersection of the arcs.

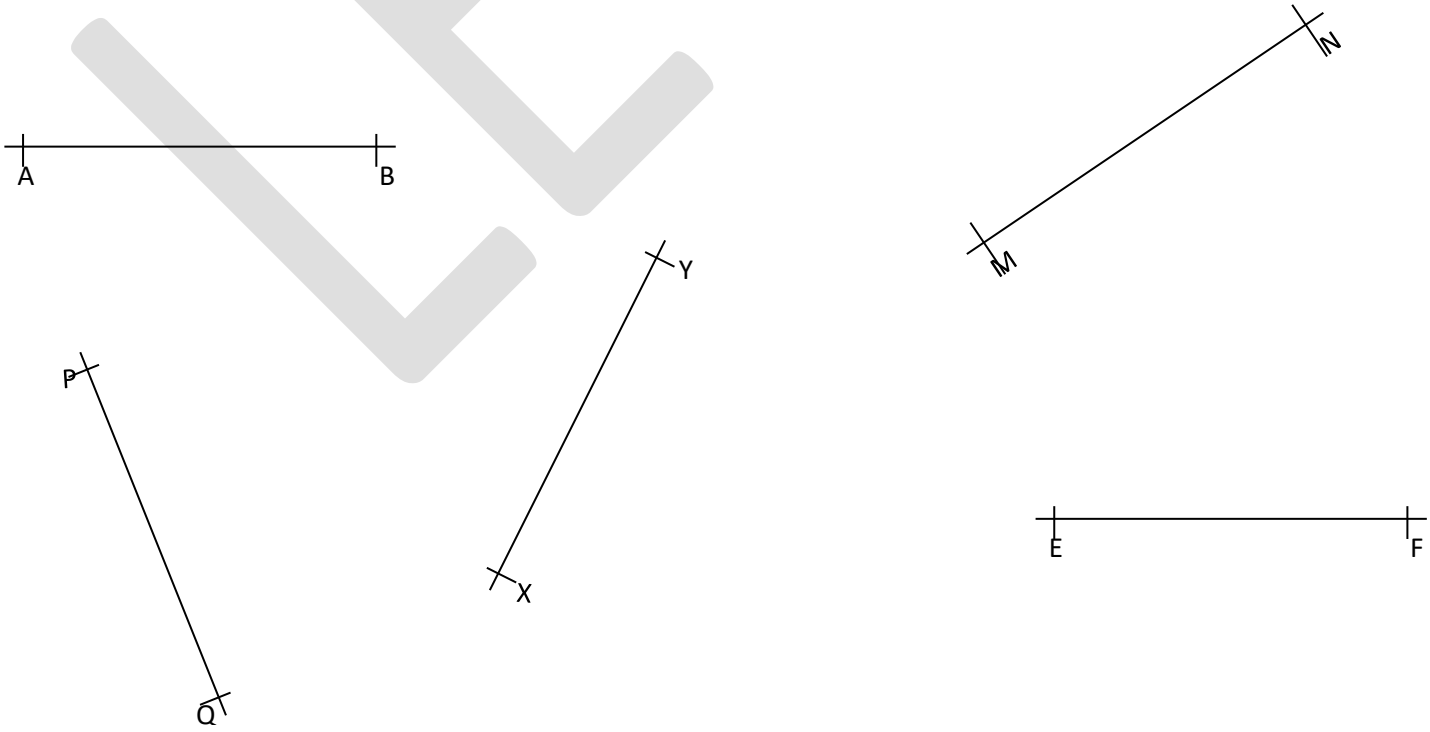


**Activity**

1. Using a pair of compasses, a sharp pencil and a ruler, bisect the following angles



**2.** Using a pair of compasses, a sharp pencil and a ruler, bisect the following lines

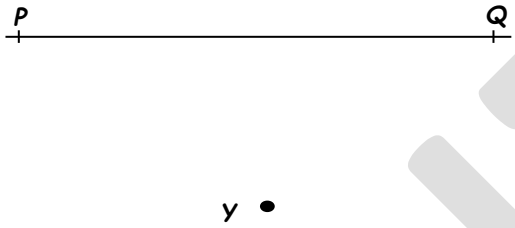


**Dropping perpendicular lines from a point**

This is the construction of a perpendicular line from the given point to the given line

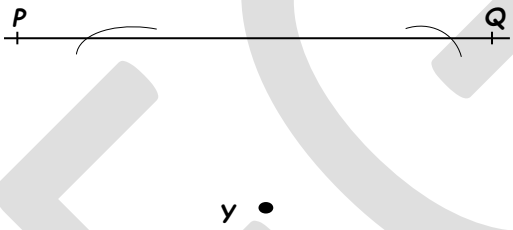
Example

Drop a perpendicular bisector from point Y to line PQ

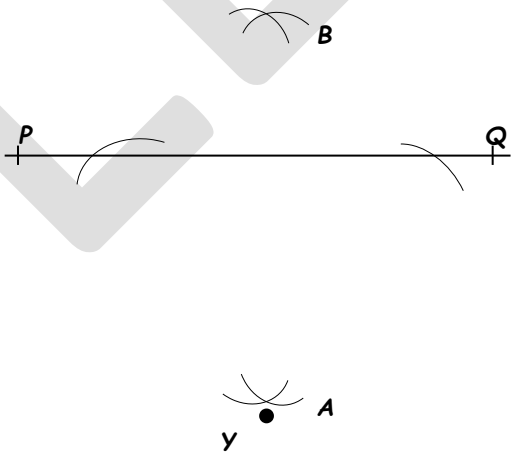



***Procedures***

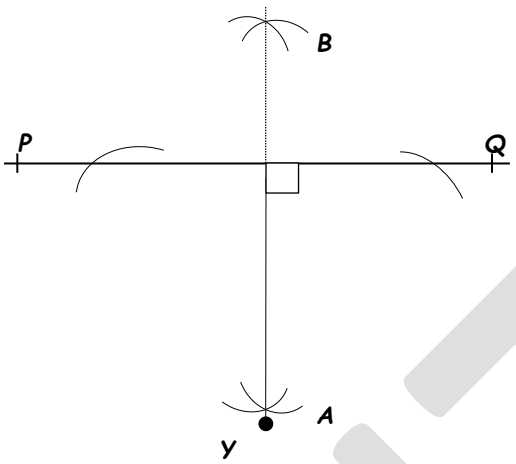
a) From the given point Y, draw arcs on line PQ




b) Put the sharp point of the compass at the meeting point of the arcs and the line PQ and draw intersecting arcs up the line PQ and the down that very line PQ



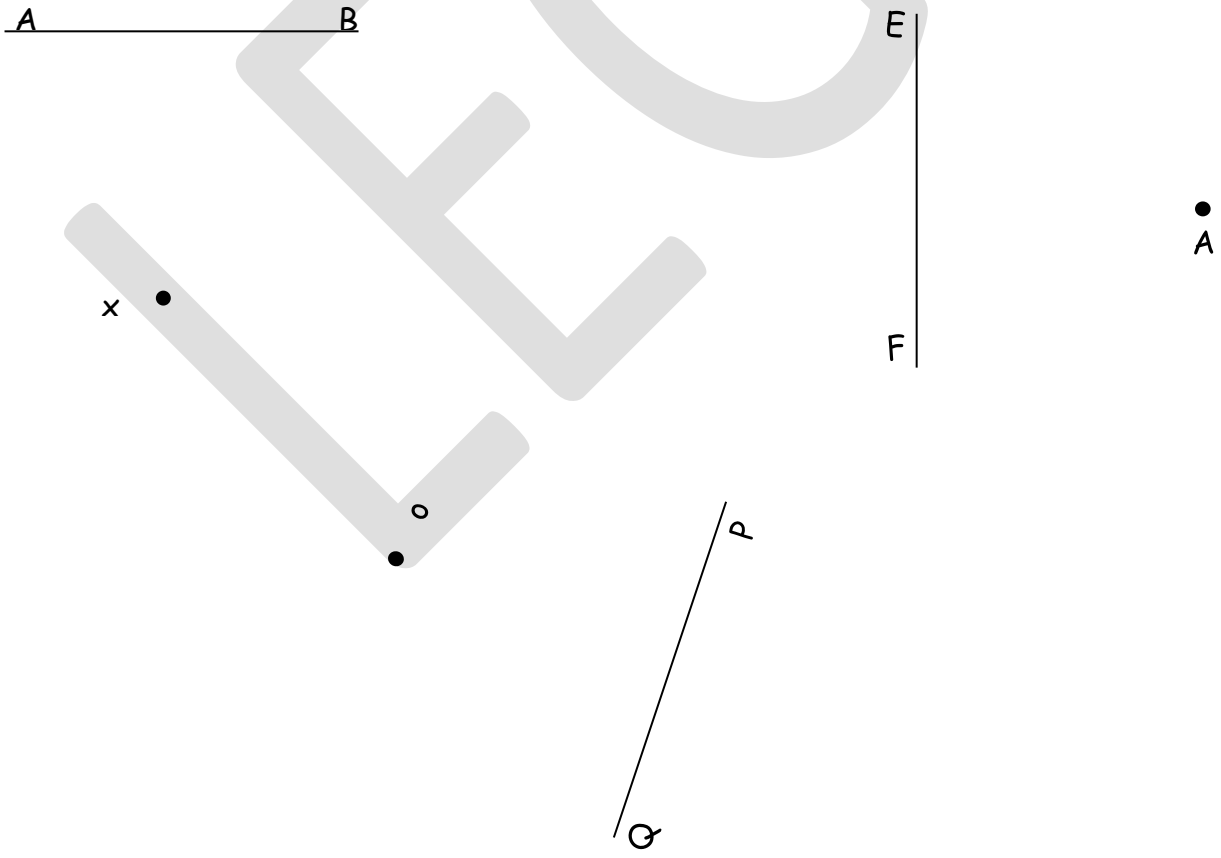
c) Using a sharp pencil and a ruler, draw a line through arcs A and B.




d) Line AB is perpendicular to line PQ

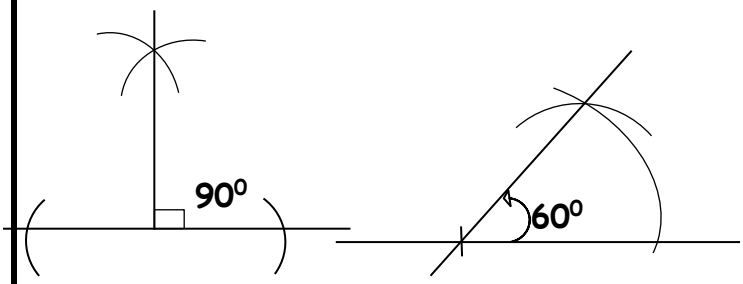
**Activity**

**Using a pair of compasses, a sharp pencil and a ruler, drop perpendicular bisectors from the given points to the given lines**

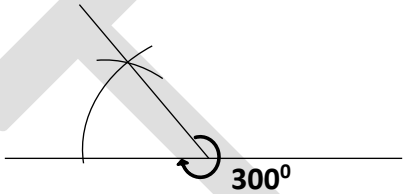


## Construction of mother angles

Angle $60^0$ and $90^0$ are called “mother” angles because all other angles are got from these angles




***Reflex angles are not commonly constructed but they also exist. We first construct the Acute or Obtuse angle then we name the reflex.***




The rest of the angles are got by bisecting the “mother” angles or a combination of both or showing the opposite side of the angle ($120^0$).

**<u>Activity</u>**

Using a pair of compasses, a sharp pencil and a ruler, construct the following angles

a) $90^0$

b) $60^0$

c) $45^0$

d) $30^0$

e) $150^0$

f) $120^0$

g) $75^0$

h) $15^0$

i) $105^0$

j) $67\frac{1}{2}^0$

k) $210^0$

l) $240^0$

m) $330^0$

n) $285^0$

**Construction of polygons**

***Triangles***

In construction of triangles, we must have it in mind that there are three types of sketches of triangle that can be constructed;

- ✓ *Side Side Side (SSS) (Given three sides of the triangle )*
- ✓ *Side Angle Side(SAS) ( Given two sides with one angle)*
- ✓ *Angle Angle Side (AAS) (Given one side with two angles)*

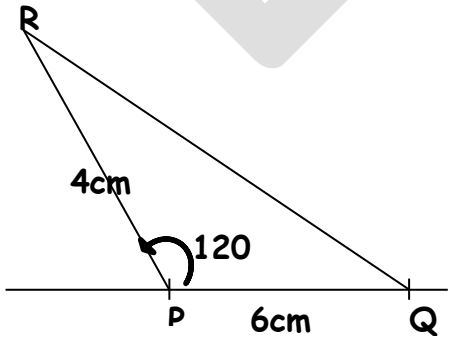
i. Always ensure that one of the sides given in the question is the base line

ii. Always put in mind that the interior angle sum of a triangle is $180^0$

**Example 1**

Using a pair of compasses, a sharp pencil and a ruler, Construct a triangle PQR such that RPQ = $120^0$, line PQ = 6cm and line PR = 4cm

***Sketch***



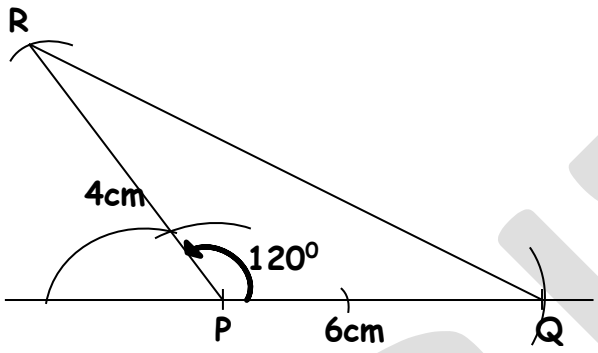
Draw line segment/ base line PQ = 6cm

Construct an angle of $120^0$ at P

Measure 4cm from P to R

Join Q to R

*Accurate diagram*

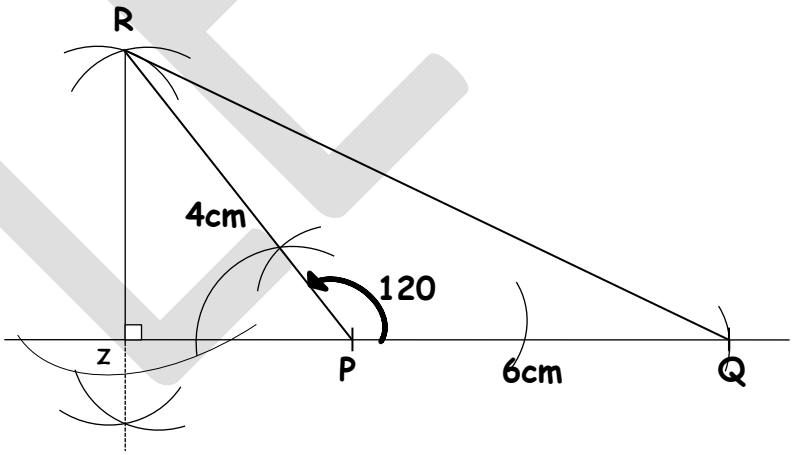



Drop a perpendicular from point R to prolonged line PQ at z

From R, draw arcs to the extension of PQ

From the arcs draw other intersecting arcs up and down the extended line PQ

Draw a line passing through the point of intersecting of the arcs of course from R



**ACTIVITY**

**1.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle PQR such that line PQ =PR=QR=7cm. measure angle PQR

**2.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle ABC such that angle ABC = $90^0$, Baseline BC= 7cm and angle BCA= $45^0$ measure line AB.

**3.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle EFG such that line FG= 7cm, FE= 6cm, EG=5cm, drop a perpendicular from point E to meet line FG at O, measure EO and use it to find the area of the triangle EFG.

**4.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle MTN such that line TN = 6cm, angle TNM = $45^0$ and angle M= $75^0$, measure side MT.

**5.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle EFG such that line FG=7cm, line EF = 6cm and angle EFG = $75^0$measure angle FGE.

**6.** Using a pair of compasses, a sharp pencil and a ruler, construct a triangle ABC such that angle ABC=$120^0$ line AB= 7cm and line BC= 6cm. Measure angle BCA.

**7.** With the help of a ruler, a sharp pencil and a pair of compasses only, construct triangle ABC in which angle ABC = $60^0$, BC = 7cm and angle BAC = $90^0$. Drop a perpendicular from A to meet BC at X.

b) Measure AX.

## Rectangle

In construction of rectangles, the following properties should be observed

a) Two opposite sides are equal and parallel.
b) A Rectangle has four right angles
c) Diagonals are equal and they do not intersect at $90^0$
d) The interior angle sum is equal to the exterior angle sum and this is $360^0$

1. Using a pair of compasses, a sharp pencil and a ruler, a rectangle ABCD where line AB =6cm and line BC= 5cm. measure diagonal BD.

2. Using a pair of compasses, a sharp pencil and a ruler, a rectangle PQRS where base line QR =7cm and diagonal PR = 8cm. Measure side RS.

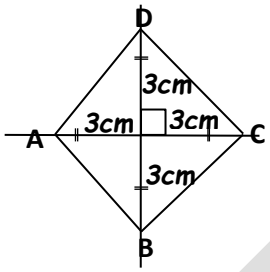
## Square

In construction of squares, the following properties should be observed;

i. All sides are equal
ii. Diagonals are equal and intersect at an angle of $90^0$
iii. It has four right angles

**Example:** Using a pair of compasses, a sharp pencil and a ruler, Construct a square ABCD of diagonal AC = 6cm

Sketch




Accurate diagram

## ACTIVITY

1. Using a pair of compasses, a sharp pencil and a ruler, Construct a square STUV of diagonal SU = 9cm

2. Using a pair of compasses, a sharp pencil and a ruler, construct a square PQRS of side 7cm. measure its diagonal QR.

3. Using a pair of compasses, a sharp pencil and a ruler, construct a square EFGH in which EF = FG = 7cm, Measure diagonal FH

4. Using a pair of compasses, a sharp pencil and a ruler, construct a square BSAM in a circle of a radius 4 cm

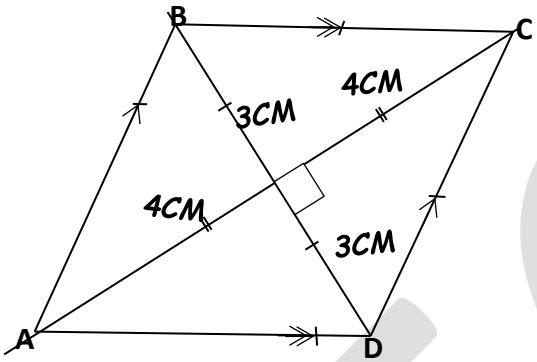
**Rhombus**

In construction of Rhombus, the following properties should be observed;

**i.** All sides are equal
**ii.** Base angles are co- interior angles (they add up to $180^0$)
**iii.** Opposite sides are parallel
**iv.** Opposite angles are equal
**v.** Diagonals are not equal
**vi.** Diagonals intersect at $90^0$

**Example:** Using a pair of compasses, a sharp pencil and a ruler, construct a Rhombus ABCD such that longer diagonal AC=8cm and shorter diagonal BD=6cmcm. Measure side AB.

Sketch accurate diagram




1. Using a pair of compasses, a sharp pencil and a ruler, construct a Rhombus PQRS such that longer diagonal PR=16 and shorter diagonal QS=12cm. measure side QR.

2. Using a pair of compasses, a sharp pencil and a ruler, construct a Rhombus EFGH such that angle EFG=$120^0$, line FG= 6cm. measure diagonal EG.

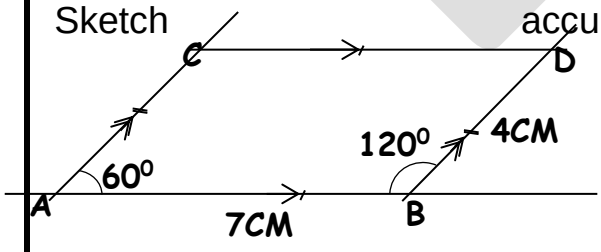
**Parallelogram**

In construction of parallelogram, the following properties should be observed;

- **i.** Two opposite side are equal and parallel
- **ii.** Base angles are co-interior angles (they add up to $180^0$)
- **iii.** Opposite angles are equal
- **iv.** Interior angle sum is $360^0$

**Example:** Using a pair of compasses, a sharp pencil and a ruler, construct a parallelogram ABCD such that line AB=7cm, line BD= 4cm and angle CAB= $60^0$ measure diagonal AD

Sketch accurate diagram



## ACTIVITY

1. *Using a pair of compasses, a sharp pencil and a ruler, construct a parallelogram ABCD with diagonal Ac=12cm,diagonal BD= 8cm and side DC=6cm. Measure angle ADC*

2. Using a pair of compasses, a sharp pencil and a ruler, construct a parallelogram ABCE such that angle ABC $=120^0$, side AB= 7cm and line AD=6cm. Drop a perpendicular line from point C to meet the prolonged line AB at X, measure CX and use it to find the area of the parallelogram ABCD

3. Follow the instructions below and construct a parallelogram in the space provided Draw a horizontal line AB of length 8cm. Draw a perpendicular bisector of line AB. Mark point O where the bisector meets line AB. Measure a length of 4cm from O along the bisector. Mark point P. Join A to P lines AP and AB form two sides of the parallelogram APCB. Complete to form a parallelogram. Measure OC

4. Using a pencil, a ruler and a pair of compasses only, draw line BC = 8cm. Construct an angle ABC = $60^0$ at point B with line AB = 5cm. construct an angle BCD = $120^0$ at point C with line CD = 5cm. then, join A to D.

What special name is given to the figure constructed?

**Kite**

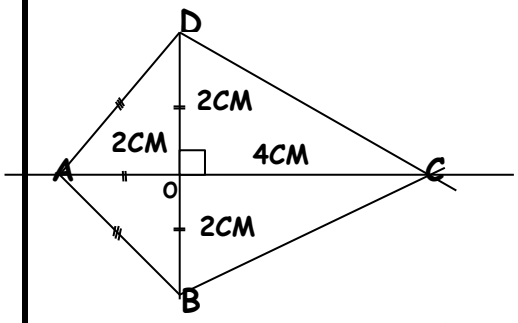
Two adjacent sides are equal

Diagonals are not equal

Diagonals intersect at $90^0$(diagonals are perpendicular)

**Example:** Using a pair of compasses, a sharp pencil and a ruler, construct a Kite such that diagonal AC= 6cm and diagonal BD= 4cm, AC meets BD at O and AO= 2cm. measure line AB and BC.

Sketch accurate diagram



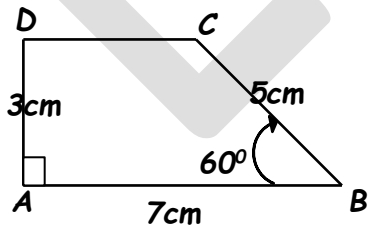

1. Using a pair of compasses, a sharp pencil and a ruler, construct a Kite PQRS such that diagonal PR= 8cm and diagonal QS= 6cm such that PR meets QS at M and PM = 3cm. measure angle SPQ

2. Using a pair of compasses, a sharp pencil and a ruler, construct a Kite MNOP such that diagonal MO= 10cm and diagonal NP= 7cm where NP meets MO at X and NX is 2cm. measure angle NOP.

**Trapezium**

Construct a quadrilateral ABCD such that angle ABC = $60^0$, BAD = $90^0$, line AB = 7cm and AD = 3cm and BC = 5cm

Sketch



Draw a base line AB = 7cm

Construct an angle of $60^0$ at B

Mark off 5cm from line BC

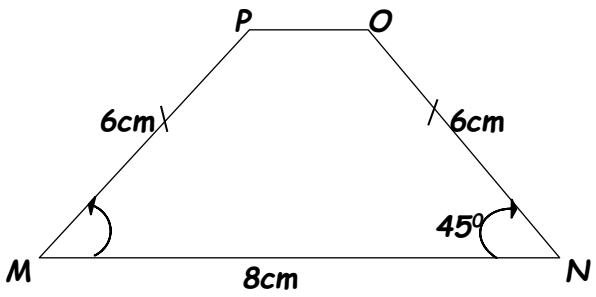
Construct an angle of $90^0$ at A

Mark off 3cm from line AD

Join D to C

1. Using a pair of compasses, a sharp pencil and a ruler, construct an isosceles trapezium such that base angle ACD = $60^0$, line CD= 7cm and side BD= 6cm. measure line AB.

2. Construct an accurate diagram whose sketch has been illustrated below




Drop a perpendicular from O to meet line MN at point y

Measure Oy and find the area of the figure MNOP

## POLYGONS

A polygon is any closed figure. Polygons have both interior and exterior angles. The interior angle sum of polygons varies depending on the number of sides of the polygon. The exterior angle is equal to the centre angle

Names of polygons

Triangle = 3 sides
Quadrilateral = 4 sides
Pentagon = 5sides
Hexagon = 6sides
Septagon / Heptagon= 7sides
Octagon = 8 sides
Nonagon = 9 sides
Decagon = 10 sides
Nuodecagon / Hedecagon = 11sides
Duo decagon = 12 sides

## Interior and exterior angles of polygons

Examples

**1.** The interior angle of a regular polygon is $60^0$

a) Find its exterior angle

| Ext < | Int < | Total |
|---|---|---|
| Ext < | $60^0$ | $180^0$ |

Ext.< + int< = $180^0$
Ext< + $60^0$ = $180^0$- $60^0$
Ext< + $60^0$ – $60^0$ = $180^0$- $60^0$
Ext< = $120^0$

b) How many sides has the polygon?

No. of side = $\frac{360^0}{ext <}$

= $\frac{360^0}{120^0}$

= 3 sides

Name the polygon

It's a triangle

**Activity**

1. The exterior angle of a regular polygon is $60^0$.
   a) Find its interior angle.

   b) Find its number of sides.

2. The interior angle of a regular polygon is $140^0$.
   a) Find its exterior angle.

   b) Find its number of sides.

   c) Name the polygon

3. The interior angle of a regular polygon is $135^0$.
   a. Find its exterior angle

   b. How many sides does the polygon have?

   c. Name the polygon

4. The interior angle of a regular polygon is $144^0$.
   a) Find its number of sides.

b) Name the polygon

5. The centre angle of a regular polygon is $30^0$. Name the polygon

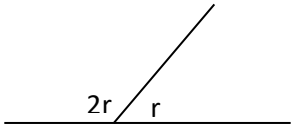
## More on Interior and exterior angles of polygons

1. The interior angle of a regular polygon is twice its exterior

a) Find the exterior angle

Int.< + ext.< = $180^0$

Let the Ext < be r




$2r + r = 180^0$

$3r = 180^0$

$\frac{3r}{3} = \frac{180^0}{3}$

$r = 60^0$

b) Name the polygon

***Remember a polygon is named according to the number of sides***

No. of sides = $\frac{360^0}{eachExt <}$

= $\frac{360^0}{60^0}$

= 6 sides

**Therefore it's a hexagon**

2. The interior angle of a regular polygon is $90^0$ more than the exterior angle.

a) What is the size of each exterior angle?

Let the exterior angle be m

| Ext< | Int < | Total |
|---|---|---|
| m | $m+90^0$ | $180^0$ |

$m + m + 90^0 = 180^0$

$2m + 90^0 = 180^0$

$2m + 90^0 - 90^0 = 180^0 - 90^0$

$2m + 0 = 90^0$

$2m = 90^0$

$\frac{2m}{2} = \frac{90^0}{2}$ **M = $45^0$**

Exterior angle = $45^0$

b) How many sides has the polygon

No. of sides = $\frac{exterior\ \ angle\ \ sum}{Each\ \ exterior\ \ angle}$

No. of sides = $\frac{360^0}{45^0}$

No. of sides = 8

3. The interior and Exterior angles of a regular polygon is in the ratio of 3:1

b) Find its exterior angle

| Int. | Ext. | total |
|---|---|---|
| 3 | 1 | 3+1=4 |
| ? | ? | $180^0$ |

4 parts rep $180^0$

1 part reps. $\frac{180^0}{4}$

1 part reps. $45^0$

Exterior angle = $45^0$

a) Name the polygon

No of polygon = $\frac{360^0}{each\ Exterior\ angle}$

= $\frac{360^0}{45^0}$

= 8 sides

***Therefore it's an octagon***

**ACTIVITY**

1. The interior angle of a regular polygon is thrice its exterior.
   a) Find its interior angle.

   b) Find its exterior angle

2. The interior angle of a regular polygon is $60^0$ more than its exterior.
   a) Find its exterior angle.

   b) How many sides has the polygon.

3. The exterior angle of a regular polygon is $90^0$ less than its interior.
   a) Find its interior angle.

   b) Find its exterior angle.

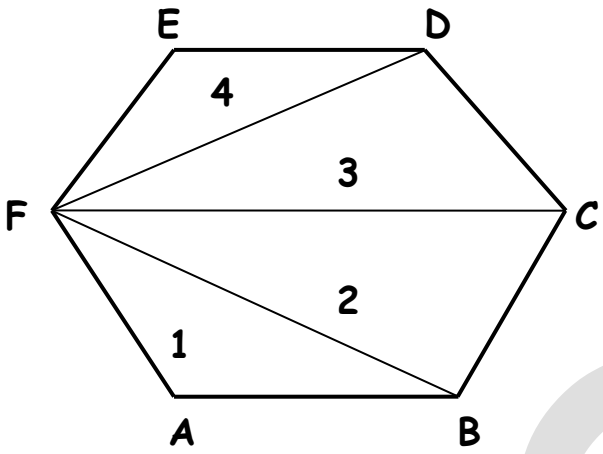
   c) Name the polygon.

4. The interior and exterior angles of a regular polygon is in the ratio of 3:2. Find its interior angle.

## Triangulation

Triangulation is the formation triangles in a given polygon. It can be used to get its interior angle sum. Remember the interior angle sum of a triangle is $180^0$

**Example** Find the sum of the interior angle sum of a hexagon




Draw lines from one vertex to different vertices
**Triangles formed are: FED (4), FDC (3), FCB (2), FBA (1)**If 1 triangle = $180^0$
Then the total interior angle sum of a hexagon is $180^0$ x 4 (number of triangles formed) Int. Angle Sum = $720^0$
Since the sides are 6 and the triangles are 4 then we can say that number of sides minus two you get the number of triangles
Number of triangles = no.of sides -2
=n-2
Int. Angle sum = $180^0$ (n-2)

Where "n" stands for number of sides of any given polygon
Int. angle Sum = $180^0$(6-2)
Int. angle Sum = $180^0$ x 4
Int. angle Sum = $720^0$
***Therefore interior angle sum = $180^0$(n – 2)***

**FINDING NUMBER OF RIGHT ANGLES IN A TRIANGLE**

A right angle = $90^0$
Number of right angles in a triangle = $\frac{180}{90}$
=2 right angles

2 right angles make 1 triangle
1 triangle = 2 right angles
2 triangles = 2x2 right angles
= 4 right angles

**Applying formula**

Number of triangles = n-2
Number of right angles = 2 x(n-2)
=2(n-2)
=2n-4

**Activity**

1. Using a diagram, find the number of triangles that can be formed in

a) Rectangle | b) Hexagon | c) Septagon

2. Find the number of triangles in a polygon with:

i. 4 Sides | ii. 9sides | iii. 12 sides

3 How many right angles can be formed in a polygon with:

a) 10 sides | c) 15 sides

b) 8 sides | d) 20 sides

3. Using triangulation method, find the interior angle sum of the following polygons.

a) Heptagon

b) Octagon

c) kite

d) Nonagon

## More on Interior Angle Sum of a polygon

Examples

1. Find the interior angle sum of a regular pentagon

   Interior Angle Sum = $180^0(n-2)$

   IAS = $180^0(5-2)$

   IAS= $180^0$x 3

   IAS = $540^0$

2. The interior angle sum of a polygon is $1080^0$, How many sides has the polygon?

$180^0(n-2)$ = IAS

$180^0(n-2) = 1080^0$

$$\frac{180^0(n-2)}{180^0} = \frac{1080^0}{180^0}$$

n-2 = 6

n-2+2=6+2

n = 8 sides

**Activity**

1. A regular polygon has one of the exterior angles $30^0$

   (i) How many sides has the polygon?

   (ii) How many right angles has the polygon?

   (iii) What is the interior angle sum of the polygon?

2. A regular polygon has one of the exterior angles $45^0$

   (i) How many sides has the polygon?

   (ii) What is the sum of interior angles?

3. The sum of interior angles of polygon totals to 12 right angles.

(i) How many sides has the polygon?

(ii) What is the size of each exterior angle of polygon?

4. The sum of interior angle of a regular polygon is $1260^0$

(i) How many sides has the polygon?

(ii) What is the size of each exterior angle?

5. The size of each interior angle of a regular polygon is $144^0$

(i) What is the name of the polygon?

(ii) What is the sum of all interior angles of the polygon?

6. The interior angle of a regular polygon is $60^0$ more than the exterior angle.

a) Find the exterior angel

b) How many sides has the polygon?

c) Calculate the interior angle sum of the regular polygon

7. The interior and exterior angles of a polygon are in a ratio of 3:2.Calculate the number of right angles of the polygon.

8. The interior angle of a regular polygon is 5 times its exterior angle. Calculate the number of right angles of the polygon.

9. The exterior angle of a regular polygon is $30^0$. Calculate the number of triangles of the polygon.

## Construction of polygons

In construction of polygons, we can either construct polygons using sides or using the centre angle given the radius

***Using a pair of compasses, a ruler, and a pencil, construct a regular pentagon with side 4 cm***

***Procedures***

Before construction, we first get the interior angle of the polygon

$\frac{360^0}{No.ofsides}$ = Ext angle

$\frac{360^0}{5} = 72^0$

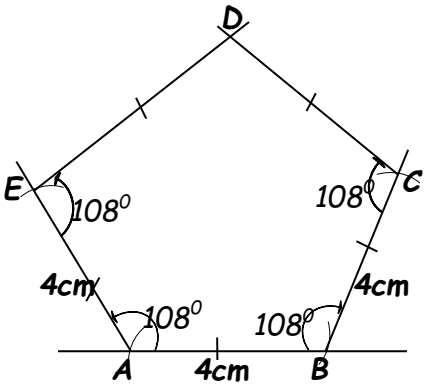
***$180^0 - 72^0 = 108^0$ (Int. angle)***

Draw a base line and measure 4cm

Name the points A and B

Measure $108^0$ at both A and B as the interior angles

Measure 4cm along the line of the angle measured and name them C and E on the side of B and A respectively




Measure other angles of $108^0$ at C and E lines from C and E will join automatically forming a regular Pentagon.

**Using a pair of compasses, a ruler, construct a regular pentagon with radius 3cm**

***Procedures***

Adjust a pair of compasses to a given radius (3cm in this case) and construct a circle

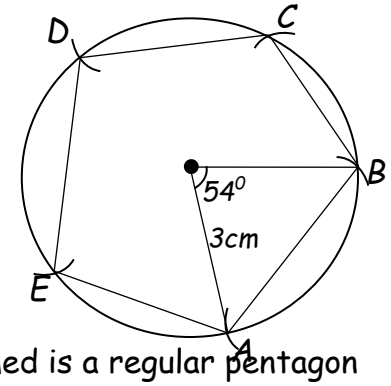
Draw a line from the centre to the circumference.

Measure an angle of $54^0$ at the centre

Adjust the pair of compasses from the first point of the first radius to the second radius at the circumference (in the space of the angle $54^0$)

Use that radius to accurately mark off other points till you go back to the beginning

Name the arcs A, B, C, D, E, join the meeting points of the arcs and the circumference A to B, B to C, C to E and E to A




Formed is a regular pentagon

**Construct a regular octagon of side 5cm**

**Steps taken**

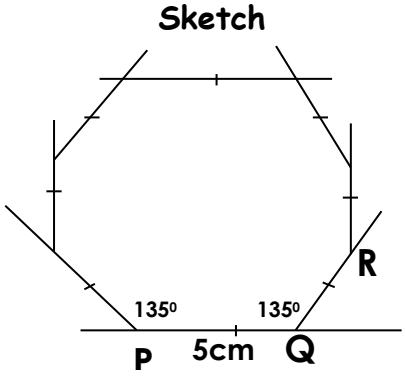
Draw a line PQ and cut off 5cm from P to Q

At point P measure $135^0$ and at point Q measure $135^0$

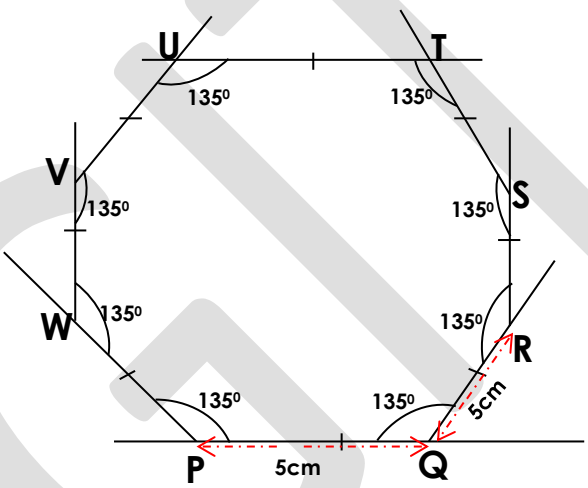
Draw a Line from point Q to point R of 5cm and measure $135^0$

Continue doing the same until the regular figure is closed

Sketch




Accurate construction




ACTIVITY

1. Using a pair of compasses, a ruler, and a pencil, construct a regular pentagon with side 5 cm

2. Using a pair of compasses, a ruler, construct a regular pentagon with radius 4cm

3. Construct a regular octagon of side 6cm

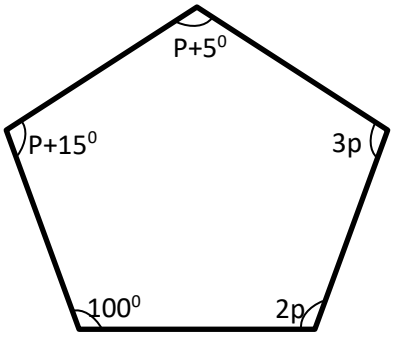
4. Construct a regular hexagon of sides 5cm

5. Construct a regular hexagon using a circle of radius 4.5cm

## Finding unknown in polygons

### Examples

Find the value of p in the figure below




***We first get the interior angle sum of the given polygon***

IAS = $180^0(n - 2)$

$=180^0( 5 - 2 )$

$=180^0 \times 3$

$= 540^0$

$P + 5^0 + p + 15^0 + 2p + 3p + 100^0 = 540^0$

$P+p+2p+3p+5^0+15^0+100^0 = 540^0$

$7p+120^0 = 540^0$

$7p +120^0 - 120^0 = 540^0 - 120^0$

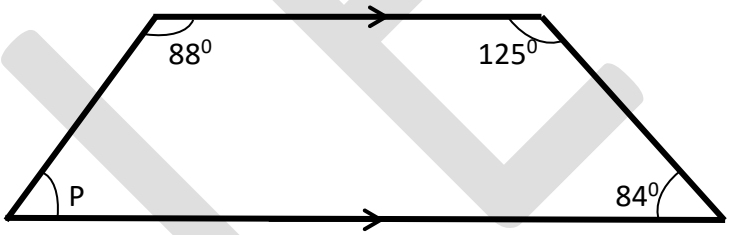
$7p = 420^0$

$\frac{7p}{7} = \frac{420^0}{7}$

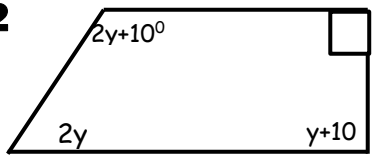
$P = 60^0$

Find the value of the unknown in the following figures

1. Find the value of p

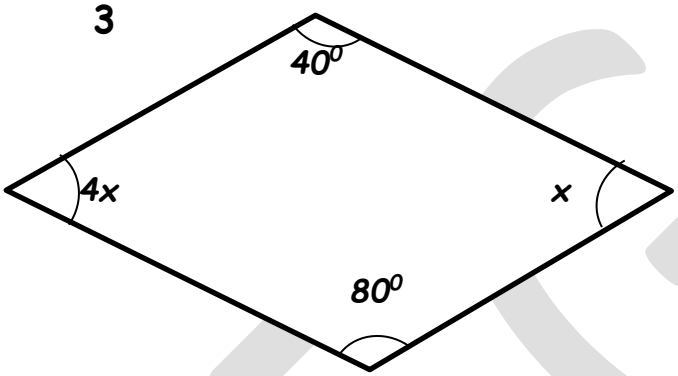


**2**

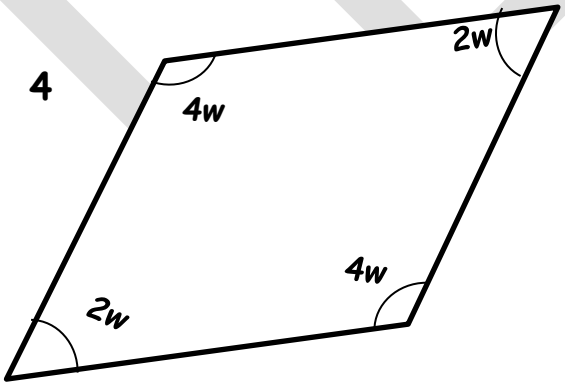



*Find the value of y.*

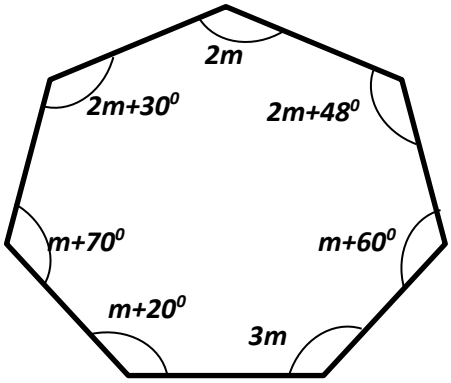
**3**



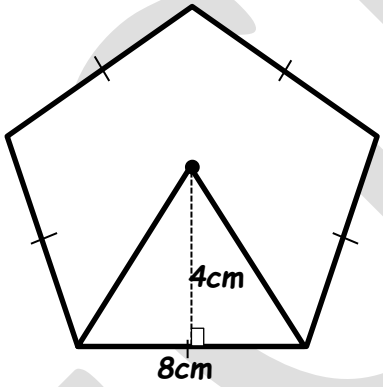

**4**



**5**




## Finding area of regular polygons




***Area of the figure is got by getting the area of the triangle multiplied by the number of sides***

Area = $\frac{1}{2}$ x base x height x number of sides/ number of triangles

Area = $\frac{1}{2}$ x 8cm x 4cm x 5

Area = $16cm^2$ x 5

Area = $80cm^2$

***<u>Method 2</u>***

***We can also use the apothem (a line from the centre perpendicular to the side of a polygon.***

***Area = $\frac{1}{2}$ a apothem (sum of all the sides)***

***Area = $\frac{1}{2}$ x 4cm x (8+8+8+8+8) cm***

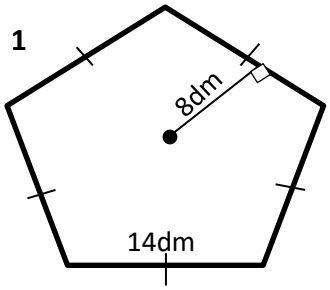
***Area = 2cm x 40cm***

***Area = $80cm^2$***

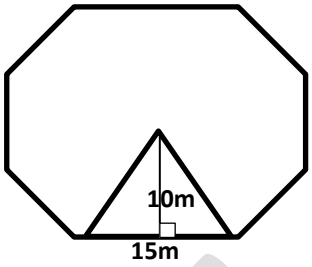
**Activity**

Find the area of the figures below

1




2




3. Find the area of the shaded part if the radius of the circle is 10dm

(π= 3.14)