**GCSE Saturday – Date 04/12/10**

**Mathematics**

**Loci**

**Loci –(plural)**

**Locus – (singular)**

**Locus – means path or shape of the path of a specified object**

**There are 4 main types of Loci namely:**

1. **Locus of a moving point from a fixed point -This is in the shape of a circle having the fixed point as the centre of the circle and the distance between the fixed point and the moving object as the radius of the circle. Example - The dog taken by its owner to a shop and tied to a pillar or post outside the shop on a leash or chain will always move in a circle around the fixed pillar with a radius equal to the length of the leash or rope used in tying the dog.**

**Dog moving round the pillar**

**LOCUS/PATH of dog’s motion around the pillar**

**Fixed pillar at the center of circle**

**Leash/rope=radius**

1. **The Locus of a moving point from two fixed points - This falls on the perpendicular bisector of the distance between the two fixed points.**

**Example: A student moving in between two fixed pillars at A and B of the school’s entrance gate, will have to walk in such a way that he keeps the same distance from the two pillars every time.**

**S1**

**A**

**B**

**S3**

**S2**

**Student position along the perpendicular bisector of AB**

**Locus of moving object from 2 fixed points**

**Fixed point B**

1. **The Locus of a moving point from a fixed line – is on the line, which is equidistant from any part of the fixed line. It forms the shape shown below:**

Semi-circular section of Locus

**B**

**F**

Fixed line LM

Linear section of Locus

Moving object

Radius (r)

**BK=KF=Radius**

L

M

K

**4. The Locus of a moving point from 2 fixed lines – lies on the angular bisector between the two fixed lines. For example if lines AB and AC are fixed sides of a school fence at an angle of say 60 ̊, the head teacher can move such that he is always going to be the same distance from both fixed fences (lines) along line AD. AD divides the angle between the two fences equally into 30 ̊ each:**

**D ̊**

**C**

**B**

**A**

**Locus of a moving point from 2 fixed lines**

**30 ̊**

**30 ̊**

**60 ̊**

**Fixed line AB**

**Fixed line AC**

**Constructing the angular bisector between two lines**

**Using a compass:**

1. With centre (the pin) at A and any suitable radius, mark an arc on lines AB & AC at points E and F respectively.
2. With centre at E and suitable radius, mark an arc between lines AB & AC
3. With centre at F and same radius as in step 2 above, mark another arc between lines AB & AC. Note the point of intersection between the last two arcs (say D).
4. Join D to A to form the angular bisector between lines AB & AC

**Home Work**

1. Construct the angular bisector between two lines AB & AC, which are at an angle 70 degrees apart.
2. Derek wants to plant a tree in his rectangular garden. The tree has to be: more than 5 metres from the back of the house, nearer to the left hand fence than the back fence, less than 8 metres from the back right hand corner of the garden.

On the diagram, shade the region where the tree could be planted.

Use a scale of 1 cm to represent 1 m.

Back fence

Back right

Corner

Left hand

fence

Back of house

***Lesson delivered by Dr. D.Kenomore (04/12/10)***