

## Section 2: Loci in the complex plane

### Crucial points

1. **You should recognise equations and inequalities which represent circles**

Any set of points of the form  $|z - (a + bi)| = r$  is represented by a circle, centre  $a + bi$ , radius  $r$ .

2. **You should recognise equations and inequalities which represent perpendicular bisectors**

Any set of points of the form  $|z - (a + bi)| = |z - (c + di)|$  is represented by the perpendicular bisector of the line joining the points  $a + bi$  and  $c + di$ . Don't mix this up with the circle locus!

3. **Make sure you show sets of points involving the argument correctly**

Remember that for the set of points  $\arg(z - (a + bi)) = \theta$  the set of points is a half-line starting from the point  $z = a + bi$ . However the point  $z = a + bi$  is not included and should be shown by an open circle.

4. **Use the correct range for the argument**

Remember that the possible values of  $\arg z$  are given by  $-\pi < \arg z \leq \pi$ . Make sure when drawing sets of points of the form  $\arg(z - (a + bi)) \leq \theta$  or  $\arg(z - (a + bi)) \geq \theta$  that you use the correct range for the argument.

5. **Be careful with inequalities**

A set of points defined using an inequality represents a region. Remember that if  $<$  or  $>$  are used, the boundary of the region (a circle or a line) is not included and should be shown as a dotted line, but if  $\leq$  or  $\geq$  are used, the boundary is included and should be shown as a solid line.