**1** Find the polar form of the following Cartesian coordinates, with angles measured in radians.

**a** (7, 24) **(2 marks)**

**b**  **(3 marks)**

**2** Convert the following polar coordinates into Cartesian form. Angles are measured in radians.

**a**  **(2 marks)**

**b**  **(2 marks)**

**3** Find polar equations for the following curves in Cartesian form, giving your answer in the form 

**a** Find the polar equation for the Cartesian equation  giving your answer in the form  **(3 marks)**

**b** Show that the curve with Cartesian equation  has polar equation  where *A* is a constant to be found. **(3 marks)**

**c** Show that the curve with Cartesian equation  has the polar equation  where *B* is a constant to be found. **(4 marks)**

**4** Sketch the following curves, where *a* is a positive constant.

**a**  giving the coordinates of the point where the curve intersects the half line  **(2 marks)**

**b** , giving the coordinates of the points where the curve intersects the initial line and the half line  **(3 marks)**

**5** **a** Find the exact area of the finite region bounded by the curve with polar equation

  and the half-lines  **(3 marks)**

**b** Find the exact area of the finite region bounded by the curve with polar equation

 and the half-lines  **(4 marks)**

**6** **a** On the same diagram sketch for  the curves with polar equations

 and  **(3 marks)**

**b** Calculate the coordinates of the points of intersection of these two curves. **(3 marks)**

**c** Find the exact value of the area of the finite region within both curves. **(6 marks)**

**7** The curve *C* polar equation  where  Find the points of contact and the polar equations of the tangents to *C* that are parallel to the initial line. **(7 marks)**