**2F Problem Solving with Tangents & Normals**

1. The point lies on the parabola with equation where is a positive constant. Show that an equation of the normal to at is
2. The point lies on the rectangular hyperbola with equation where is a positive constant.
3. Show that an equation of the tangent to at is

A rectangular hyperbola has equation . The tangent to at the point and the tangent to at the point meet at the point

1. Find the coordinates of and .
2. The parabola has equation . The point is a general point on . The line is normal to at the point .
3. Show that an equation for is

The point lies on . The normal to at passes through the point as shown on the diagram. The region is bounded by this line, the curve and the -axis.

1. Given that lies in the first quadrant, show that the area of the shaded region is