

2. The distinct points A and B, where $x = 3$ lie on the parabola C with equation $y^2 = 27x$.
- a) The line l_1 is the tangent to C at A and the line l_2 is the tangent to C at B.
Given that at A, $y > 0$, find the coordinates of A and B.

b) Draw a sketch showing the parabola C. Indicate A, B, l_1 and l_2 .

c) Find equations for l_1 and l_2 , giving your answer in the form $ax + by + c = 0$.

3. The point P with coordinates $(75,30)$ lies on the parabola C with equation $y^2 = 12x$. Find the equation of the tangent to C at P , giving your answer in the form $y = mx + c$

4. The point $P(4,8)$ lies on the parabola C with equation $y^2 = 4ax$. Find:
- a) The value of a

- b) An equation of the normal to C at P

The normal to C at P cuts the parabola again at the point Q . Find:

c) The coordinates of Q

d) The length PQ , giving your answer as a simplified surd