9 The point P with coordinates (4, 4) lies on the curve C with equation $y = \frac{1}{4}x^2$

(a) Find an equation of

(i) the tangent to C at P,

(ii) the normal to C at P.

(6)

The point Q lies on the curve C. The normal to C at Q and the normal to C at P intersect at the point R. The line RQ is perpendicular to the line RP.

(b) Find the coordinates of Q.

(2)

(c) Find the x-coordinate of R.

(4)

The tangent to C at P and the tangent to C at Q intersect at the point S.

(d) Show that the line RS is parallel to the y-axis.

(5)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 17 marks)