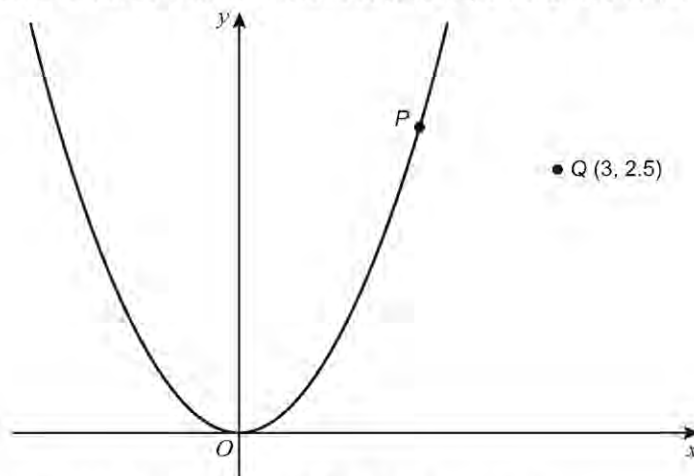


15 A curve has equation

$$y = x^2$$

The point Q has coordinates $(3, 2.5)$

The point P on the curve which is closest to the point Q is shown on the diagram below.



15 (a) Show that the x -coordinate of P satisfies the equation

$$2x^3 - 4x - 3 = 0$$

[4 marks]

15 (b) The Newton–Raphson method is to be used to find an approximate solution to the equation

$$2x^3 - 4x - 3 = 0$$

Show that the Newton–Raphson method generates the iterative formula

$$x_{n+1} = \frac{4x_n^3 + 3}{6x_n^2 - 4}$$

[4 marks]

15 (c) Starting with $x_0 = 3$, use the iterative formula given in part (b) to find the value of x_3 .
Give your answer to **three** decimal places.

[2 marks]

15 (d) Hence find the distance PQ .
Give your answer to **two** decimal places.

[2 marks]