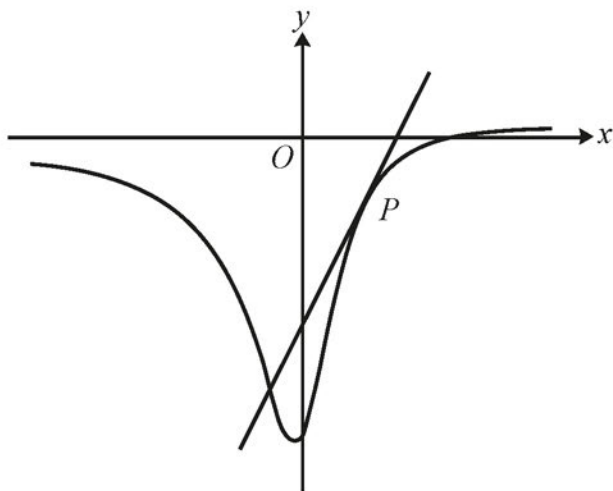


5 In this question you must show detailed reasoning.



The diagram shows the curve with equation $y = \frac{2x-3}{4x^2+1}$. The tangent to the curve at the point P has gradient 2.

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

$$4x^3 + 3x - 3 = 0.$$

[5]

(b) Show by calculation that the x -coordinate of P lies between 0.5 and 1.

[2]

(c) Show that the iteration

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

cannot converge to the x -coordinate of P whatever starting value is used.

[2]

(d) Use the Newton-Raphson method, with initial value 0.5, to determine the coordinates of P correct to 5 decimal places.

[5]