Differentiating, $\frac{dy}{dx} = 2ax + b$

At the point (1, 8) $\frac{dy}{dx} = 17$

$\therefore\ 17 = 2a + b$ [i.e. put $x = 1$] ③

In ① substitute $c = -7$. $\therefore 8 = a + b - 7$

$15 = a + b$ ④

③ − ④ $2 = a$

Substitute in ④ $15 = 2 + b$

$13 = b$

So we have $a = 2, b = 13, c = -7$.

b The curve $y = 2x^2 + 13x - 7$ cuts the x-axis where $y = 0$.

So $2x^2 + 13x - 7 = 0$

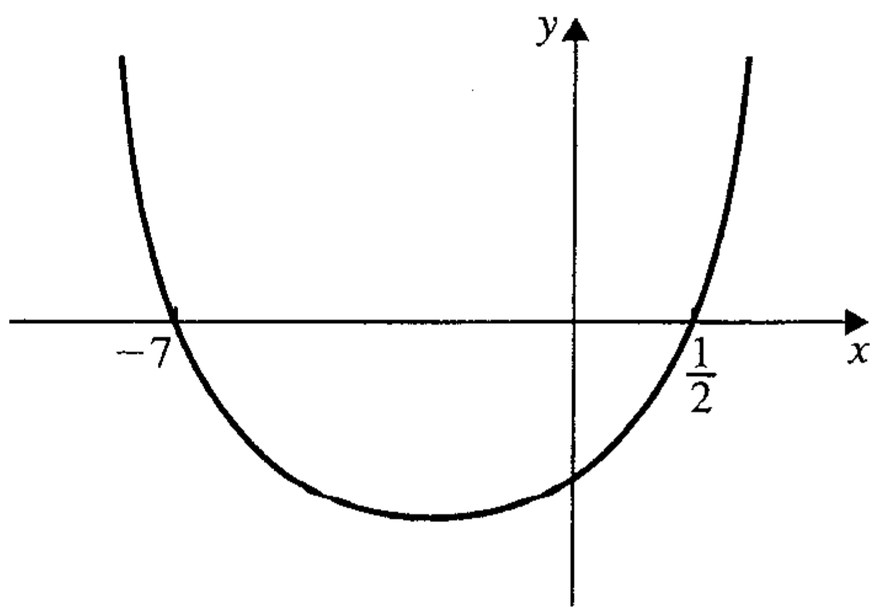
$(2x - 1)(x + 7) = 0$

$x = \frac{1}{2}$ or -7

The curve cuts the x axis at $(\frac{1}{2}, 0)$ and $(-7, 0)$.

c The coefficient of x^2 is positive so the curve is '∪ shaped'. The curve cuts the x-axis at $x = \frac{1}{2}$ and $x = -7$.

The curve may be sketched.



EXERCISE 4B

1 Find $\frac{dy}{dx}$ in the following:

a $y = x^5$ **b** $y = x^7$ **c** $y = 2x^3$

d $y = 5x^4$ **e** $y = 3x$ **f** $y = 2$

g $y = 6x^{\frac{4}{3}}$ **h** $y = 2x^{-1}$ **i** $y = 3x^{\frac{1}{3}}$

j $y = 7x^{-2}$ **k** $y = 6\sqrt{x}$ **l** $y = \frac{5}{x}$