

The gradient of  $y = x^2 + ax + b$  at the point (1,-3) is -4.

Find **a** and **b**.

$$y = x^2 + ax + b$$

Find the gradient function

$$\frac{dy}{dx} = 2x + a$$

gradient = -4 when  $x = 1$

substitute  $\frac{dy}{dx} = -4$ ,  $x = 1$

$$-4 = 2(1) + a$$

simplify

$$-4 = 2 + a$$

$$-6 = a$$

$$y = x^2 + ax + b$$

(1,-3) is a point on the curve.

substitute  $x = 1$ ,  $y = -3$

$$-3 = 1^2 + a(1) + b$$

simplify

$$-4 = a + b$$

we know  $a = -6$

$$-4 = -6 + b$$

$$2 = b$$

$$a = -6$$

$$b = 2$$

