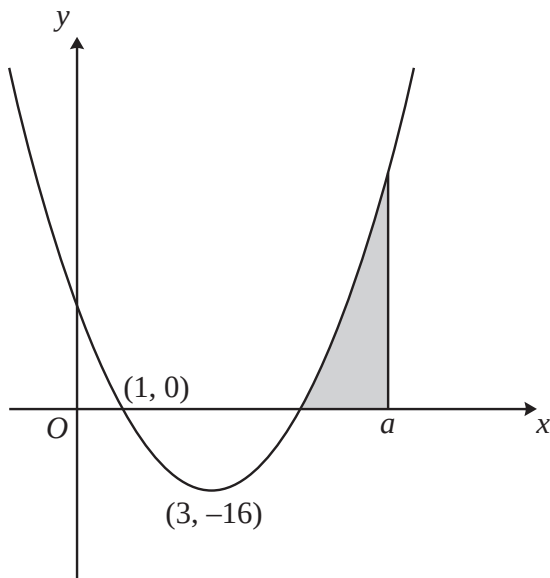




The diagram shows the curve with equation $y = f(x)$ where $f(x)$ is a quadratic function. The curve intersects the x -axis at the point $(1, 0)$ and has its minimum at the point $(3, -16)$.

(a) Show that $f(x) = 4x^2 - 24x + 20$. **[3]**

The shaded region is enclosed by the curve, the x -axis, and the line $x = a$. The area of the shaded region is $\frac{100}{3}$ units².

(b) Determine the exact value of the constant a . **[6]**