

12.

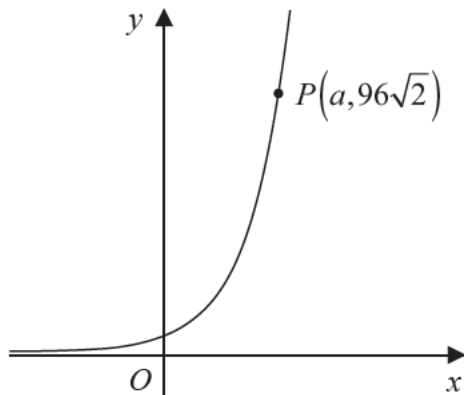


Figure 6

**In this question you must show all stages of your working.**

**Solutions relying on calculator technology are not acceptable.**

Figure 6 shows a sketch of part of the curve with equation

$$y = 3 \times 2^{2x}$$

The point  $P(a, 96\sqrt{2})$  lies on the curve.

(a) Find the exact value of  $a$ .

(3)

The curve with equation  $y = 3 \times 2^{2x}$  meets the curve with equation  $y = 6^{3-x}$  at the point  $Q$ .

(b) Show that the  $x$  coordinate of  $Q$  is

$$\frac{3 + 2\log_2 3}{3 + \log_2 3}$$

(5)