**10.**

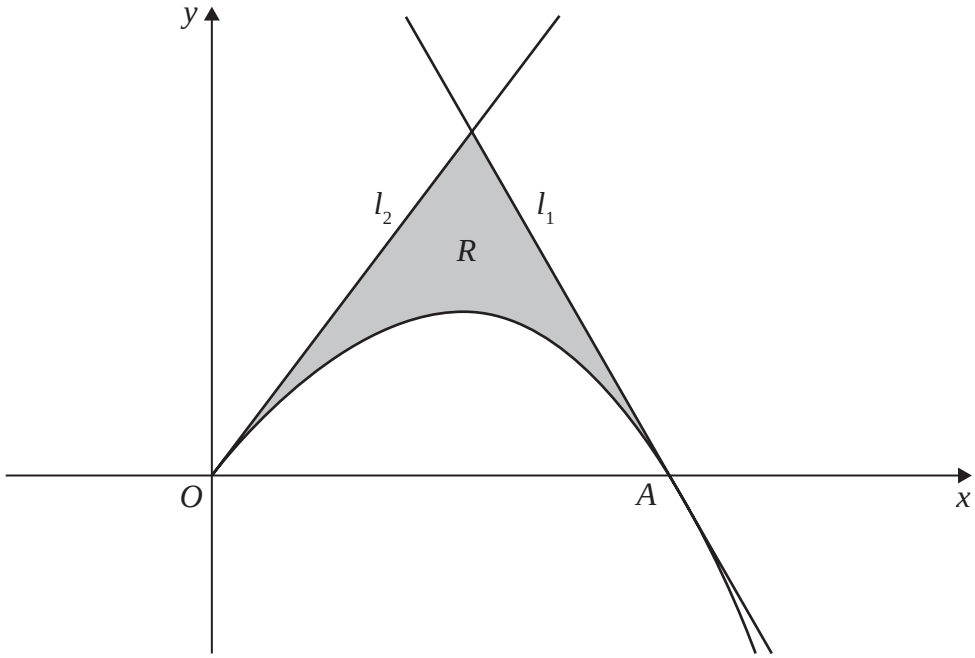


**Figure 3**

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

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

Figure 3 shows a sketch of part of the curve with equation

$$y = 8x - x^{\frac{5}{2}} \qquad x \geqslant 0$$

The curve crosses the $x$-axis at the point $A$.

(a) Verify that the $x$ coordinate of $A$ is 4

**(1)**

The line $l_1$ is the tangent to the curve at $A$.

(b) Use calculus to show that an equation of line $l_1$ is

$$12x + y = 48$$

**(3)**

The line $l_2$ has equation $y = 8x$

The region $R$, shown shaded in Figure 3, is bounded by the curve, the line $l_1$ and the line $l_2$

(c) Use algebraic integration to find the exact area of $R$.

**(5)**