8.

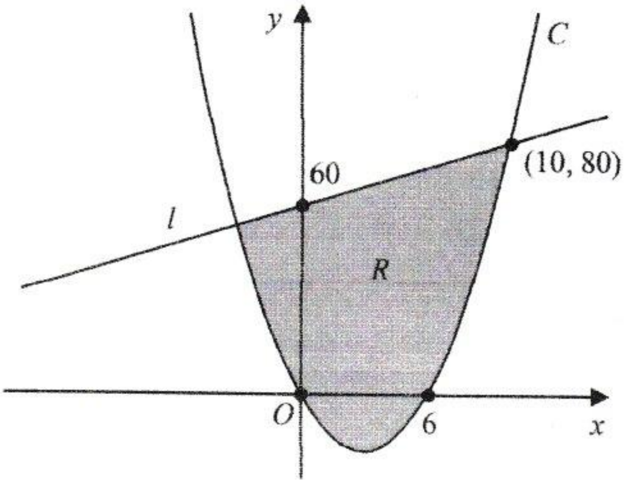

Figure 3

Figure 3 shows a sketch of a curve C and a straight line l.

Given that

- C has equation $y = \mathrm{f}(x)$ where $\mathrm{f}(x)$ is a quadratic expression in x
- C cuts the x-axis at 0 and 6
- l cuts the y-axis at 60 and intersects C at the point $(10, 80)$

use inequalities to define the region R shown shaded in Figure 3.

(5)

The shaded area is below l and above c. So we need to find the equations of l and c

l: $y = mx + c$ From the data on the figure $c = 60$

$m = \frac{80-60}{10} = 2$

So l is $\underline{y = 2x + 60}$

C: Is a quadratic with solutions $x = 0$ $x = 6$

So is of the form $A(x-0)(x-6) = y$

ie $Ax(x-6) = y$

But $y = 80$ when $x = 10$ so

$80 = A.10(10-6)$

$80 = 40A$

$A = 2 \Rightarrow y = 2x(x-6) = \underline{2x^2 - 12x}$

So the region R is $\underline{\underline{2x^2 - 12x \leq y \leq 2x + 60}}$