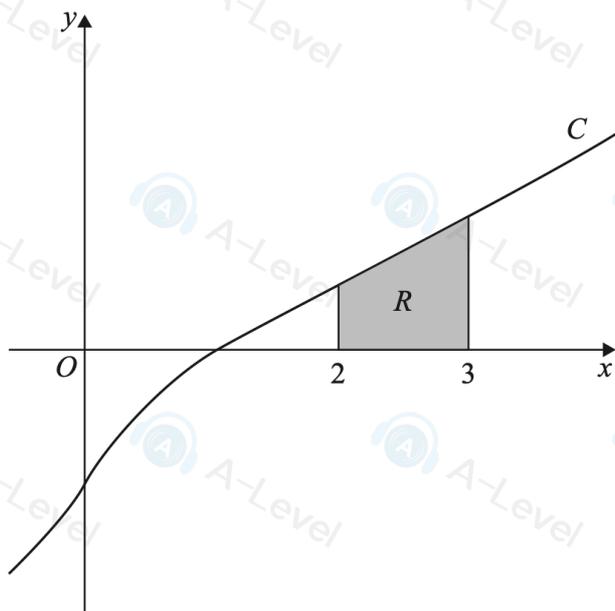**Figure 1**

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

Figure 1 shows a sketch of part of the curve C with equation $y = g(x)$ where

$$g(x) = \frac{3x^3 - 5x^2 + 7x - 5}{x^2 + 1}$$

Given that

$$\frac{3x^3 - 5x^2 + 7x - 5}{x^2 + 1} \equiv Ax + B + \frac{Cx + D}{x^2 + 1}$$

(a) (i) find the values of the constants A, B and C

   (ii) show that $D = 0$

(4)

The finite region R, shown shaded in Figure 1, is bounded by C, the x-axis and the lines with equations $x = 2$ and $x = 3$

(b) Find the exact area of region R using algebraic integration.
   Give the answer in the form $\alpha + \ln\beta$ where α and β are constants to be found.

(4)