

**Question 3**

**(25 marks)**

Let  $f(x) = -x^2 + 12x - 27$ ,  $x \in \mathbb{R}$ .

**(a) (i)** Complete Table 1 below.

Table 1							
$x$	3	4	5	6	7	8	9
$f(x)$	0	5			8		

**(ii)** Use Table 1 and the trapezoidal rule to find the approximate area of the region bounded by the graph of  $f$  and the  $x$ -axis.

**(b) (i)** Find  $\int_3^9 f(x)dx$ .

**(ii)** Use your answers above to find the percentage error in your approximation of the area, correct to one decimal place.

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