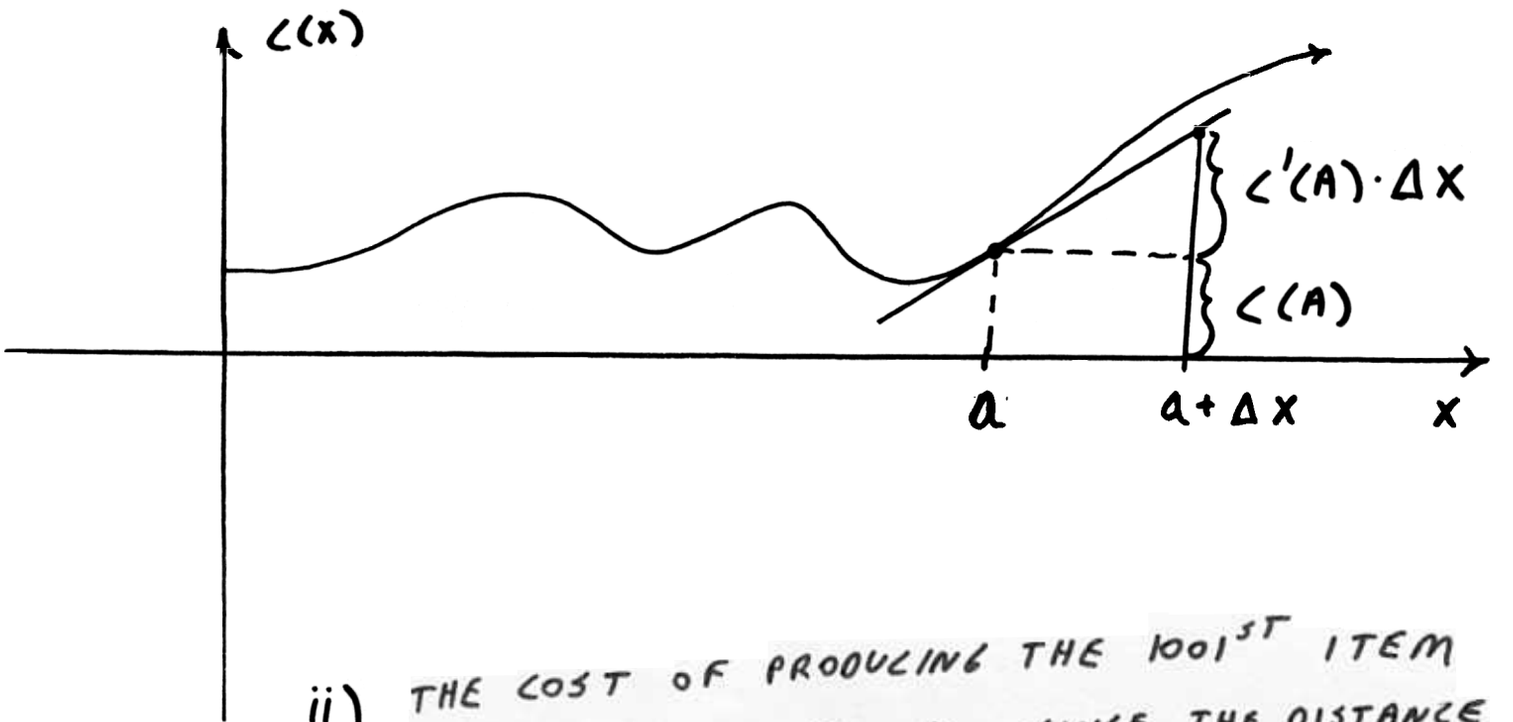
**7.** (12 points) Consider the figure shown below for part (i).

(i) Label the quantities indicated by vertical brackets in terms of $C(a)$, $C'(a)$ and $\Delta x$.

(ii) Let the cost to produce $x$ items be given by the differentiable function $C(x)$. Explain why $C'(1000)$ should be a reasonable approximation to the cost of producing the 1001st item.




ii) THE COST OF PRODUCING THE 1001ST ITEM IS $C(1001) - C(1000)$. SINCE THE DISTANCE FROM 1000 TO 1001 IS RELATIVELY SMALL, THE RISE IN THE FUNCTION $C(x)$, $C(1001) - C(1000)$ IS WELL APPROXIMATED BY THE RISE IN ITS TANGENT LINE ON THE INTERVAL $[1000, 1001]$. THIS IS $C'(1000)(1001-1000)$, IE. $C'(1000)$