





(d) (i) Make a conjecture about the exact value of the area bounded by  $y = f_k(x)$  and the  $x$ -axis over  $0 \leq x \leq \frac{\pi}{2k}$ , for any value of  $k$ .

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(1 mark)

(ii) Prove or disprove your conjecture.


(3 marks)