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

(a) Use de Moivre's theorem to show that

$$\sin 5\theta \equiv a\sin^5\theta + b\sin^3\theta + c\sin\theta$$

where a, b and c are integers to be determined.

(5)

(b) Hence determine the possible exact values of $\sin^2\left(\frac{k\pi}{5}\right)$ where $k \in \mathbb{Z}$

(4)

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Question 9 continued

Question 9 continued

(Total for Question 9 is 9 marks)

TOTAL FOR PAPER IS 75 MARKS

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