6. Given that $n \in \mathbb{N}$, use algebra to prove by contradiction that

" if $n^2 - 4n + 5$ is even then n is odd"

(4)

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Question 6 continued

(Total for Question 6 is 4 marks)

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

Use the substitution $x = 4\sin\theta$ to find the exact value of

$$\int_{2}^{2\sqrt{3}} \frac{1}{\left(16-x^2\right)^{\frac{3}{2}}}\,\mathrm{d}x$$

(6)

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