**10.** (a) Statement X: "If $x^2$ is an odd square number, then $x$ is an odd number."

A student was asked to prove Statement X using proof by contradiction.

The student begins by writing the following.

> Assume that $x^2$ is an odd square number and $x$ is an even number.
>
> If $x$ is an even number it can be expressed in the form $x = 2m \quad m \in \mathbb{N}$

Complete the proof.

**(2)**

(b) Use proof by contradiction to show that

"There are no integers $a$ and $b$ such that $a^2 - 4b = 27$"

You may assume Statement X without further justification.

**(4)**

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**Question 10 continued**

**Question 10 continued**

**(Total for Question 10 is 6 marks)**

**TOTAL FOR PAPER IS 75 MARKS**

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