Question Number	Scheme	Marks
1	Assume that there exists a number m such that when m^3 is even, m is odd	B1
	If m is odd then $m=2p+1$ (where p is an integer) and $m^3=(2p+1)^3=...$	M1
	$=8p^3+12p^2+6p+1$	A1
	$2\times(4p^3+6p^2+3p)+1$ is odd and hence we have a contradiction so if n^3 is even, then n is even.	A1
		(4) **(4 marks)**

B1: For setting up the contradiction.

Eg Assume that there exists a number m such that when m^3 is even, m is odd

Condone a contra-positive statement here

"Assume that there exists a number m such that when m^3 is even, m is not even"

As a minimum accept "assume if m^3 is even then m is odd."

Condone the other way around " assume if n is odd then n^3 is even"

M1: Attempts to cube an odd number. Accept an attempt at $(2p+1)^3$, $(2p-1)^3$

Look for $(2p+1)^3=...p^3.....$

A1: $(2p+1)^3=8p^3+12p^2+6p+1$ or simplified equivalent such as $2\times(4p^3+6p^2+3p)+1$.

For $(2p-1)^3=8p^3-12p^2+6p-1$ or equivalent such as $2\times(4p^3-6p^2+3p-1)+1$

A1: For a fully correct proof. Requires correct calculations with reason and conclusion

E.g. 1 Correct calculations $(2p+1)^3=8p^3+12p^2+6p+1=$

Reason (even +1) = odd

Conclusion "hence we have a contradiction, so if n^3 is even, then n is even."

E.g. 2 Correct calculations $(2p+1)^3=8p^3+12p^2+6p+1$

Reason $=2\times(4p^3+6p^2+3p)+1$ = odd

Conclusion "this is contradiction, so proven."

E.g. 3 Correct calculations $(2p-1)^3=8p^3-12p^2+6p-1$

Reason = $8p^3-12p^2+6p$ is even so $8p^3-12p^2+6p-1$ is odd