(3) Let $n, m \in \mathbb{Z}$. If $n^2(m+3)$ is even then n is even or
(a) m is odd.

(Contraposition)

Proof: Assume that n is odd and m is even.

We want to show that $n^2(m+3)$ is odd follows.

Observe that $n = 2k_1 + 1$ for some $k_1 \in \mathbb{Z}$ and

$m = 2k_2$ for some $k_2 \in \mathbb{Z}$.

Then it follows that $n^2(m+3) = (2k_1+1)^2(2k_2+3)$.

Note that $(2k_1+1)^2(2k_2+3) = (4k_1^2 + 4k_1 + 1)(2k_2+3)$

$= 8k_1^2k_2 + 12k_1^2 + 8k_1k_2 + 12k_1 + 2k_2 + 3$

$= 2(4k_1^2k_2 + 6k_1^2 + 4k_1k_2 + 6k_1 + k_2 + 1) + 1$

Since $4k_1^2k_2 + 6k_1^2 + 4k_1k_2 + 6k_1 + k_2 + 1 \in \mathbb{Z}$, then we

have that $n^2(m+3)$ is odd as desired

$\blacksquare$