6. (a) Prove by induction that, for all $n \in \mathbb{Z}^+$

$$f(n) = n^5 + 4n$$

is divisible by 5

(6)

(b) Show that $f(-x) = -f(x)$ for all $x \in \mathbb{R}$

(1)

(c) Hence prove that $f(n)$ is divisible by 5 for all $n \in \mathbb{Z}$

(2)