

Show that

(i) $x^n - a^n$ is divisible by $x - a$, $n \in \mathbb{N}$

$$\text{let } f(x) = x^n - a^n, \quad f(a) = a^n - a^n = 0$$

$\therefore (x - a)$ is a factor of $f(x)$.

(ii) $x^n + a^n$ is divisible by $x + a$, $n \in \mathbb{N}$, n is odd.

$$\text{let } g(x) = x^n + a^n$$

$$g(\underline{-a}) = (-a)^n + a^n = (-1)^n a^n + a^n = -a^n + a^n = 0$$

$\Rightarrow (x - (-a)) = (x + a)$ is a factor of $g(x)$.