

Some Polynomial Questions

① If $P(x)$ is a polynomial function and $P(x)$ is divided by $x - \frac{1}{2}$ giving a remainder of 5, what is the remainder when $P(x)$ is divided by $2x - 1$?

② Use the factor theorem to show that $x^2 - x - 2$ is a factor of $x^3 - 6x^2 + 3x + 10$.

③ For $n \in \mathbb{N}$ show that $x - a$ is a factor of $x^n - a^n$.

④ For $n \in \mathbb{N}$, show that $x + a$ is a factor of $x^{2n+1} + a^{2n+1}$.

⑤ Is $x - a$ a factor of $x^n + ax^{n-1} - 2a^n$, $n \in \mathbb{N}$?

⑥ Find the remainder when $f(x)$, of degree greater than 3, is divided by $(x - a)(x - b)$.

[Hint: The remainder is of degree ≤ 1]