Factor Theorem

Factor Theorem: If $P(x)$ is a polynomial and $P(c) = 0$, then $x - c$ is a factor of $P(x)$. Conversely, if $x - c$ is a factor of $P(x)$, then $P(c) = 0$.

Practice Exercises

Use the factor theorem to determine whether the binomial is a factor of the given polynomial.

1. $(a - 1); P(x) = a^3 - 2a^2 + a - 2$
2. $(x - 4); P(x) = 2x^3 - 9x^2 + 9x - 20$
3. $(2x - 1); P(x) = 2x^3 - 7x^2 + x + 1$
4. $(y + 3); P(x) = 2y^3 + y^2 - 13y + 6$
5. $(b - 2); P(x) = 4b^3 - 3b^2 - 8b + 4$

Problem Set

Use the factor theorem to determine whether the binomial is a factor of the given polynomial.

1. $(x - 2); P(x) = x^{20} - 4x^{18} + 3x - 6$
2. $(x - 4); P(x) = 3x^3 - 15x^2 + 10x + 8$
3. $(x + 2); P(x) = x^4 - 3x^3 + 5x - 2$
4. $(x - 2); P(x) = 3x^4 - 6x^3 + 5x + 10$
5. $(x + 5); P(x) = x^3 + x^2 - 25x + 25$