

Factoring Polynomial Expressions

Given the following polynomial expressions and their roots (zeroes), find the complete factored form of each expression.

1. $2x^3 + x^2 - 43x - 60$, roots: $-4, -\frac{3}{2}, 5$

2. $x^3 + 8x^2 + 17x + 10$, roots: $-5, -1, -2$

3. $2x^3 + 8x^2 + 2x - 12$, roots: $-2, 1, -3$

4. $-3x^3 + 24x^2 - 12x - 144$, roots: $6, -2, 4$

5. $x^3 + 5x^2 + 7x + 3$, roots: $-1, -3$

6. $-x^3 - 7x^2 + 42x + 216$, roots: $6, -4, -9$

7. $7x^3 + 63x^2 + 56x - 420$, roots: $2, -5, -6$

8. $-12x^3 - 46x^2 - 22x + 24$, roots: $-\frac{4}{3}, \frac{1}{2}, -3$

9. $8x^3 - 22x^2 - 141x - 90$, roots: $-\frac{5}{2}, 6, -\frac{3}{4}$

10. $4x^3 - 8x^2 - 3x + 9$, roots: $\frac{3}{2}, -1$

Find the roots (zeroes) of the following functions.

11. $f(x) = x^3 - 9x$

12. $f(x) = x^3 + 4x^2 - 5x$

13. $f(x) = -9x^2 + 3x + 12$

14. $f(x) = x^3 + 2x^2 + 9x + 18$

15. $f(x) = 2x^3 - 12x^2 + 16x - 96$