

4.2 Real Zeros of Polynomials

Section 1: Find all the possible rational zeros. Then find the rational zeros, if they exist.

1. $f(x) = 2x^4 - 7x^3 - 19x^2 - 3x + 7$

2. $g(x) = x^3 + 3x^2 - x - 3$

3. $h(x) = x^3 + 5x^2 - x - 5$

4. $f(x) = 2x^5 + 5x^4 - 11x^3 + 4x^2$

5. $f(x) = \frac{1}{12}x^3 - \frac{1}{12}x^2 - \frac{2}{3}x + 1$

6. $p(x) = 0.1x^3 - 1.9x + 3$

Section 2: Write the given polynomial as a product of linear factors and another $g(x)$ that is either a constant or has no rational zeros.

7.
 $f(x) = 2x^3 - 4x^2 + x - 2$

8.
 $g(x) = x^6 + 2x^5 + 3x^4 + 6x^3$

9.
 $h(x) = x^5 + 4x^3 + x^2 + 6x$

Section 3: Use the Bounds Test to show that the given values are lower and upper bounds for the real zeros of the polynomial.

10. $p(x) = x^3 + 2x^2 - 7x + 20$ Lower = -5 Upper = 2

11. $f(x) = x^3 - 15x^2 - 16x + 12$ Lower = -2 Upper = 16

12. $h(x) = -x^5 - 5x^4 + 9x^3 + 18x^2 - 68x + 176$ Lower = -7 Upper = 3

Section 4: Find an Upper and Lower bound for the given polynomial. Then find all real zeros of the polynomial.

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

14. $g(x) = 6x^3 - 11x^2 + 6x - 1$

15. $p(x) = x^3 + x^2 + 2x + 2$

16. $f(x) = x^4 + x^3 - 19x^2 + 32x - 12$

17. $k(x) = x^5 + 3x^4 - 4x^3 - 11x^2 - 3x + 2$