4-5

Practice

Locating Zeros of a Polynomial Function

Determine between which consecutive integers the real zeros of each function are located.

1. $f(x) = 3x^3 - 10x^2 + 22x - 4$

2. $f(x) = 2x^3 + 5x^2 - 7x - 3$

3. $f(x) = 2x^3 - 13x^2 + 14x - 4$

4. $f(x) = x^3 - 12x^2 + 17x - 9$

5. $f(x) = 4x^4 - 16x^3 - 25x^2 + 196x - 146$

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

Approximate the real zeros of each function to the nearest tenth.

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

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

9. $f(x) = 4x^4 - 6x^2 + 1$

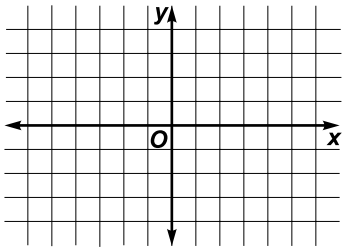
10. $f(x) = 2x^3 + x^2 - 1$

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

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

Use the Upper Bound Theorem to find an integral upper bound and the Lower Bound Theorem to find an integral lower bound of the zeros of each function.

13. $f(x) = 3x^4 - x^3 - 8x^2 - 3x - 20$

14. $f(x) = 2x^3 - x^2 + x - 6$

15. For $f(x) = x^3 - 3x^2$, determine the number and type of possible complex zeros. Use the Location Principle to determine the zeros to the nearest tenth. The graph has a relative maximum at (0, 0) and a relative minimum at (2, −4). Sketch the graph.