

Practice 6-2

Polynomials and Linear Factors

For each function, determine the zeros. State the multiplicity of any multiple zeros.

1. $y = (x - 5)^3$

2. $y = x(x - 8)^2$

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

4. $f(x) = x^4 - 8x^3 + 16x^2$

5. $f(x) = 9x^3 - 81x$

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

Write each function in standard form.

7. $y = (x - 5)(x + 5)(2x - 1)$

8. $y = (2x + 1)(x - 3)(5 - x)$

9. A rectangular box is 24 in. long, 12 in. wide, and 18 in. high. If each dimension is increased by x in., write a polynomial function in standard form modeling the volume V of the box.

Write a polynomial function in standard form with the given zeros.

10. $-1, 3, 4$

11. $1, 1, 2$

12. $-3, 0, 0, 5$

13. -2 multiplicity 3

Write each expression as a polynomial in standard form.

14. $x(x - 1)^2$

15. $(x + 3)^2(x + 1)$

16. $(x + 4)(2x - 5)(x + 5)^2$

Write each function in factored form. Check by multiplication.

17. $y = 2x^3 + 10x^2 + 12x$

18. $y = x^4 - x^3 - 6x^2$

19. $y = -3x^3 + 18x^2 - 27x$

Find the zeros of each function. Then graph the function.

20. $y = (x + 1)(x - 1)(x - 3)$

21. $y = (x + 2)(x - 3)$

22. $y = x(x - 2)(x + 5)$

Find the relative maximum, relative minimum, and zeros of each function.

23. $f(x) = x^3 - 7x^2 + 10x$

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

Write each polynomial in factored form. Check by multiplication.

25. $x^3 - 6x^2 - 16x$

26. $x^3 + 7x^2 + 12x$

27. $x^3 - 8x^2 + 15x$

28. A rectangular box has a square base. The combined length of a side of the square base, and the height is 20 in. Let x be the length of a side of the base of the box.

- a. Write a polynomial function in factored form modeling the volume V of the box.
- b. What is the maximum possible volume of the box?