



6-1 Polynomials

Rewrite each polynomial in standard form. Then identify the leading coefficient, degree, and number of terms. Name the polynomial.

1. $3x^2 + 3x^4 - x^3 + 2$

Leading coefficient:
Degree:
Number of Terms:
Name:

2. $14 - 3x^2 + x$

Leading coefficient:
Degree:
Number of Terms:
Name:

3. $2x - 3 + x^3 + 3x^5$

Leading coefficient:
Degree:
Number of Terms:
Name:

4. $22 + 6x$

Leading coefficient:
Degree:
Number of Terms:
Name:

Add or subtract. Write your answer in standard form.

5. $(2x^2 - 3x + 6) + (-5x^2 + 4x - 6)$

6. $(3x^3 - 8x^2) - (6x^3 + 3x^2 - 7x)$

7. $(14 - 2x - x^2) + (-7 + 5x - 9x^2)$

8. The cost on x -units of a product can be modeled by $C(x) = x^3 - 18x + 12$. Evaluate $C(x)$ for $x = 50$, and describe what the value represents.

Graph each polynomial function on a calculator. Describe the graph, and identify the number of real zeros.

9. $g(x) = x^3 - 7x - 6$

Graph each polynomial function on a calculator. Describe the graph, and identify the number of real zeros.

10. $h(x) = -x^5 + x$

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

6-2 Multiplying Polynomials

Find each product.

12. $7x(4x - 8x^3)$

13. $(x - y)(x^2 + y^2)$

14. $\left(\frac{1}{2}x + 5\right)^2$

15. $(3x - 2y)(5x^2 + x - 6)$

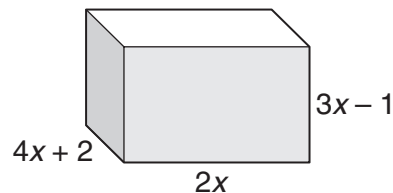
Expand each expression.

16. $(x + 5)^3$

17. $(x - 2y)^4$

18. $(2x + 1)^4$

19. Find the polynomial expression in terms of x for the volume of the rectangular prism shown.



6-3 Dividing Polynomials

Long Divide.

20. $(18x^3 - 3x - 10) \div (x + 2)$

Synthetically divide.

21. $(2x^3 - 18x^2 - 35) \div (x - 7)$

Use synthetic substitution to evaluate the polynomial for the given value.

22. $P(x) = x^3 - 9x^2 + 3x + 7$
for $x = 2$

23. $P(x) = x^4 - x^3 + 10x^2 - 10x + 5$
for $x = -1$

6-4 Factoring Polynomials

Factor each expression.

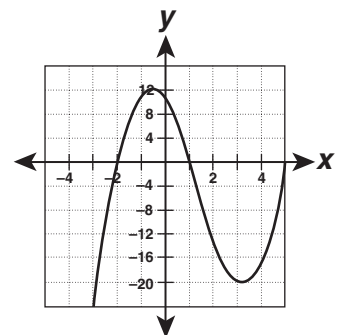
24. $9x^2 - 25$

25. $2x^3 - 8x^2 - 24x$

26. $a^3 - 6a^2 + 3a - 18$

27. $t^9 - 64$

28. The volume of a box is modeled by the function $V(x) = x^3 - 4x^2 - 7x + 10$. Identify the values of x for which the volume is 0 and use the graph to factor $V(x)$.



6-5 Finding Real Roots of Polynomial Equations

29. The yearly profit of a company in thousands of dollars can be modeled by $P(t) = x^4 - 34x^2 + 225$, where t is the number of years since 1999. Factor to find the years in which the profit was 0.

Identify the roots of each equation. State the multiplicity of each root.

30. $x^3 + 3x^2 - 72x - 324 = 0$

31. $2x^3 - 2x^2 - 28x + 48 = 0$

6-6 Fundamental Theorem of Algebra

Write the simplest polynomial function with the given roots.

33. $-1, 2, 3$

34. $i, -i, 0$