PRACTICE & PROBLEM SOLVING

Scan for Multimedia

Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

18. **Use Structure** Expand $(3x + 4y)^3$ using Pascal's Triangle and the Binomial Theorem.

19. **Error Analysis** Emma factored $625g^{16} - 25h^4$. Describe and correct the error Emma made in factoring the polynomial.

$625g^{16} - 25h^4$

$= (25g^4)^2 - (5h^2)^2$

$= (25g^4 + 5h^2)(25g^4 - 5h^2)$

✗

20. **Higher Order Thinking** Use Pascal's Triangle and the Binomial Theorem to expand $(x + i)^4$. Justify your work.

21. **Use Structure** Expand the expression $(2x - 1)^4$. What is the sum of the coefficients?

22. **Error Analysis** A student says that the expansion of the expression $(-4y + z)^7$ has seven terms. Describe and correct the error the student may have made.

23. **Reason** The sum of the coefficients in the expansion of the expression $(a + b)^n$ is 64. Use Pascal's Triangle to find the value of n.

24. **Use Structure** Factor $x^3 - 125y^6$ in the form $(x - A)(x^2 + Bx + C)$. What are the values of A, B, and C?

Generalize How many terms will there be in the expansion of the expression $(x + 3)^n$? Explain how you know.

Make Sense and Persevere How could you use polynomial identities to factor the expression $x^6 - y^6$?

PRACTICE

27. Prove the polynomial identity.
$x^4 - y^4 = (x - y)(x + y)(x^2 + y^2)$

SEE EXAMPLE 1

Use polynomial identities to multiply the expressions. SEE EXAMPLE 2

28. $(x + 9)(x - 9)$

29. $(x + 6)^2$

30. $(3x - 7)^2$

31. $(2x - 5)(2x + 5)$

32. $(4x^2 + 6y^2)(4x^2 - 6y^2)$

33. $(x^2 + y^6)^2$

34. $(8 - x^2)(8 + x^2)$

35. $(6 - y^3)^2$

36. $18 \cdot 22$

37. $103 \cdot 97$

38. $(7 + 9)^2$

39. $(10 + 5)^2$

Use polynomial identities to factor the polynomials or simplify the expressions. SEE EXAMPLE 3

40. $x^8 - 9$

41. $x^9 - 8$

42. $8x^3 + y^9$

43. $x^6 - 27y^3$

44. $4x^2 - y^6$

45. $216 + 27y^{12}$

46. $64x^3 - 125y^6$

47. $\frac{1}{16}x^6 - 25y^4$

48. $9^3 + 6^3$

49. $10^3 + 5^3$

50. $10^3 - 3^3$

51. $8^3 - 2^3$

Use the Binomial Theorem to expand the expressions. SEE EXAMPLES 4 and 5

52. $(x + 3)^3$

53. $(2a - b)^5$

54. $\left(b - \frac{1}{2}\right)^4$

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

56. $\left(2x + \frac{1}{3}\right)^3$

57. $(x^3 + y^2)^6$

58. $(d - 3)^4$

59. $(2m + 2n)^6$

60. $(n + 5)^5$

61. $(3x - 0.2)^3$

62. $(4g + 2h)^4$

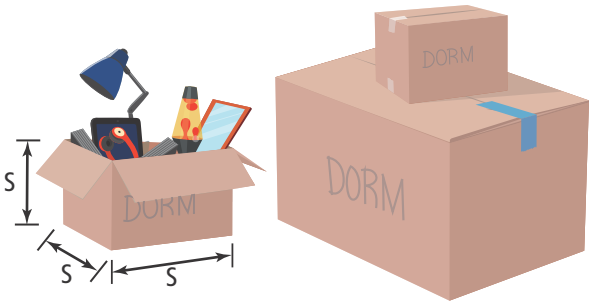
63. $\left(m^2 + \frac{1}{2}n\right)^3$

PRACTICE & PROBLEM SOLVING

Practice Tutorial
Mixed Review Available Online

APPLY

64. Use Structure A medium-sized shipping box with side length s units has a volume of s^3 cubic units.



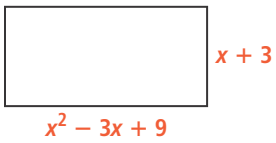
a. A large shipping box has side lengths that are 3 units longer than the medium shipping box. Write a binomial expression for the volume of the large shipping box.

b. Expand the polynomial in part a to simplify the volume of the large shipping box.

c. A small shipping box has side lengths that are 2 units shorter than the medium shipping box. Write a binomial expression for the volume of the small shipping box.

d. Expand the polynomial in part c to simplify the volume of the small shipping box.

65. Reason The dimensions of a rectangle are shown. Write the area of the rectangle as a difference of cubes.



66. A Pythagorean triple is a set of three positive integers a, b, and c that satisfy $a^2 + b^2 = c^2$. The identity $(x^2 - y^2)^2 + (2xy)^2 = (x^2 + y^2)^2$ can be used to generate Pythagorean triples. Use the identity to generate a Pythagorean triple when $x = 5$ and $y = 4$.

ASSESSMENT PRACTICE

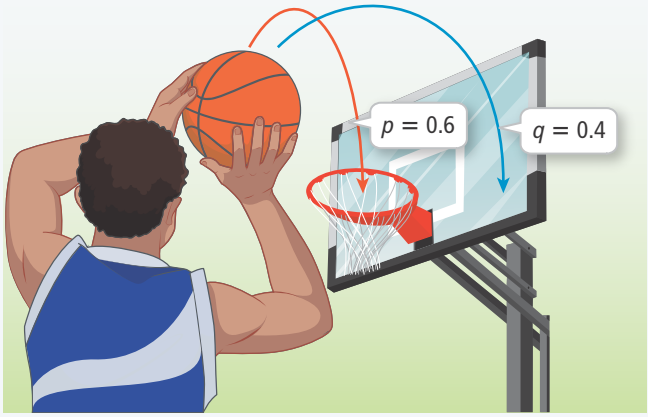
67. Are the expressions below perfect square trinomials? Select *Yes* or *No*.

	Yes	No
$x^2 + 16x + 64$		
$4x^2 - 44x + 121$		
$9x^2 - 15x + 25$		

68. SAT/ACT How many terms are in the expansion of $(2x + 7y)^9$?

Ⓐ 2 Ⓑ 7 Ⓒ 8 Ⓓ 9 Ⓔ 10

69. Performance Task If an event has a probability of success p and a probability of failure q, then each term in the expansion of $(p + q)^n$ represents a probability. For example, if a basketball player makes 60% of his free throw attempts, $p = 0.6$ and $q = 0.4$. To find the probability the basketball player will make exactly h out of k free throws, find $C_{k-h}p^hq^{k-h}$, where C_{k-h} is a coefficient of row k of Pascal's Triangle, p is the probability of success, and q is the probability of failure.



Part A What is the probability the basketball player will make exactly 6 out of 10 free throws? Round to the nearest percent.

Part B Another basketball player makes 80% of her free throw attempts. Write an expression to find the probability of this basketball player making exactly 7 out of 10 free throws. Describe what each variable in the expression represents.

Part C Find the probability that the basketball player from Part B will make exactly 7 out of 10 free throws. Round to the nearest percent.