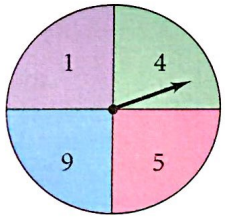
A Practice by Example

Examples 1, 2 (page 475)

Find each square.

1. $(c + 1)^2$
2. $(x + 4)^2$
3. $(2v + 11)^2$
4. $(3m + 7)^2$
5. $(w - 12)^2$
6. $(b - 5)^2$
7. $(6x - 8)^2$
8. $(9j - 2)^2$

9. **Games** Suppose you play a game with two spinners like the one shown at the right. Let C represent spinning an even number. Let D represent spinning an odd number. The probability of C is $\frac{1}{4}$. The probability of D is $\frac{3}{4}$.
   a. Simplify $(\frac{1}{4}C + \frac{3}{4}D)^2$.
   b. Find $P(C \text{ and } C)$.
   c. How does the answer in part (b) relate to the polynomial in part (a)?



Example 3 (page 476)

Mental Math **Find each square.**

10. 61^2
11. 99^2
12. 48^2
13. 302^2
14. 499^2

Example 4 (page 476)

Find each product.

15. $(x + 4)(x - 4)$
16. $(a + 8)(a - 8)$
17. $(d + 7)(d - 7)$
18. $(h + 15)(h - 15)$
19. $(y + 12)(y - 12)$
20. $(k + 5)(k - 5)$

Example 5 (page 477)

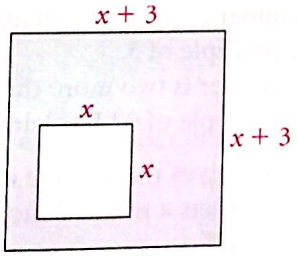
Mental Math **Find each product.**

21. $31 \cdot 29$
22. $89 \cdot 91$
23. $52 \cdot 48$
24. $197 \cdot 203$
25. $299 \cdot 301$

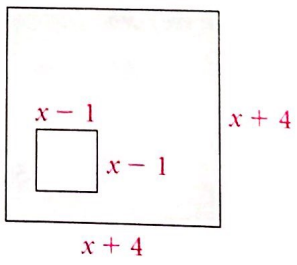
B Apply Your Skills

Geometry **Find the area of each shaded region. Write your answers in standard form.**

26.



27.



Find each square.

28. $(x + 3y)^2$ **29.** $(5p - q)^2$ **30.** $(6m + n)^2$ **31.** $(x - 7y)^2$

32. $(4k + 7j)^2$ **33.** $(2y - 9x)^2$ **34.** $(3w + 10t)^2$ **35.** $(6a + 11b)^2$

36. $(5p - 6q)^2$ **37.** $(6h - 8p)^2$ **38.** $(y^5 - 9x^4)^2$ **39.** $(8k + 4h)^2$

Real-World Connection

The cow in the photo shows a typical roan coat.

40. Biology The coat color of shorthorn cattle is determined by two genes, Red R and White W. RR produces red, WW produces white, and RW produces a third type of coat color called roan.

	R	W
R	RR	RW
W	RW	WW

a. Model the Punnett square with the square of a binomial.

b. If both parents have RW, what is the probability the offspring will also be RW?

c. Write an expression to model a situation where one parent is RW while the other is RR.

d. What is the probability that the offspring of the parents in step (c) will have a white coat?

41. a. Copy and complete the table.

b. Describe any patterns you see.

c. Writing How does the difference of squares account for the pattern in the table?

$4^2 = 16$	$3 \cdot 5 = 15$
$5^2 = \blacksquare$	$4 \cdot 6 = 24$
$6^2 = \blacksquare$	$5 \cdot 7 = \blacksquare$
$7^2 = \blacksquare$	$6 \cdot 8 = \blacksquare$

42. Open-Ended Give a counterexample to show that $(x + y)^2 = x^2 + y^2$ is false.

43. Critical Thinking Does $(3\frac{1}{2})^2 = 9\frac{1}{4}$? Explain.

Find each product.

44. $(3y + 5w)(3y - 5w)$ **45.** $(p + 9q)(p - 9q)$ **46.** $(2d + 7g)(2d - 7g)$

47. $(7b - 8c)(7b + 8c)$ **48.** $(g + 7h)(g - 7h)$ **49.** $(g^3 + 7h^2)(g^3 - 7h^2)$

50. $(2a^2 + b)(2a^2 - b)$ **51.** $(11x - y^3)(11x + y^3)$ **52.** $(4k - 3h^2)(4k + 3h^2)$

Challenge

53. Find the general formula for $(a + b + c)^2$.

54. Games Suppose you play a game by tossing 3 coins. You can find the probabilities by simplifying $(\frac{1}{2}H + \frac{1}{2}T)^3$.

a. Simplify the expression.

b. Use the answer you found in part (a) to find the probability of getting a head and two tails (HT^2).

55. Number Theory You can use factoring to show that the sum of two multiples of 3 is also a multiple of 3.

If m and n are integers, then $3n$ and $3m$ are multiples of three.
$3m + 3n = 3(m + n)$
Since $(m + n)$ is an integer, $3(m + n)$ is a multiple of three.

a. Show that if a number is one more than a multiple of 3, then its square is also one more than a multiple of 3.

b. Reasoning If a number is two more than a multiple of 3, is its square also two more than a multiple of 3? Explain.

56. The formula $V = \frac{4}{3}\pi r^3$ gives the volume of a sphere. Find the formula for the volume of a sphere that has a radius 3 more than r. Write your answer in standard form.