

## 8.4 Multiplying Special Cases

\* Use FOIL To solve.  
What do you notice?

$$(A+B)^2 \text{ or } (A-B)^2$$

(A)  $(x+2)(x+2)$

(B)  $(2x+3)(2x+3)$

\* Square a Binomial  
means to multiply a  
binomial by itself.

(A)  $(x+2)(x+2)$

F  $x^2$

O  $2x$

I  $2x$

L  $4$

$x^2 + 4x + 4$

Example :

$$(x+2)^2$$

$$(x+2)(x+2)$$

OR

$$(2x+3)^2$$

$$(2x+3)(2x+3)$$

(B)  $(2x+3)(2x+3)$

F  $4x^2$

O  $6x$

I  $6x$

L  $9$

$4x^2 + 12x + 9$

\* The square of a  
binomial is the  
square of the 1<sup>st</sup> term  
plus or minus twice  
the product of the  
2 terms plus the  
square of the last term

\* Review Problem 1 on pg. 505

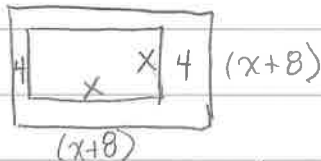
\* Got it #1)

A)  $(n-7)^2$   
 $n^2 - 14n + 49$

B)  $(2x+9)^2$   
 $4x^2 + 36x + 81$

\* Review Problem 2 on pg. 505

\* Got it #2)



Total Area of the patio & walkway =  $(x+8)^2$   
Walkway =  $x^2 + 16x + 64$

Area of the patio =  $x^2$

Area of the walkway = Total area - area of patio  
of patio & walkway

$$= (x^2 + 16x + 64) - x^2$$

$$= (16x + 64) \text{ ft}^2$$

\* Review Problem 3 on pg. 505

\* Got it 3a) 7,225

b) Examples:  $(80+5)^2$  or  $(100-15)^2$

\* Use FOIL to solve?  
What do you notice?

(C)  $(x-8)(x+8)$

(D)  $(3x-1)(3x+1)$

$(A+B)(A-B)$

(C)  $(x-8)(x+8)$

F  $x^2$

O  $8x$

I  $-8x$

L  $-64$

$x^2 - 64$

(D)  $(3x-1)(3x+1)$

F  $9x^2$

O  $3x$

I  $-3x$

L  $-1$

$9x^2 - 1$

\* Binomials that differ only by signs (The product of a Sum & Difference)

$(A+B)(A-B) = A^2 - B^2$

The product of the sum & of the difference of 2 terms is the square of the 1<sup>st</sup> term, minus the square of the 2<sup>nd</sup> term

\* Got it #4)

A)  $(x+9)(x-9)$   
 $x^2-81$

B)  $(6+3m)(6-3m)$   
 $36-9m^2$

C)  $(3c-4)(3c+4)$   
 $9c^2-16$

\* Review Problem 5

\* Got it #5)  $(50+2)(50-2)$   
 $2500-4 = 2496$

\* Always check using FOIL &  
make sure your signs  
are correct!

# 8-4 Practice

## Multiplying Special Cases

Form G

Simplify each expression.

1.  $(x + 7)^2$

2.  $(w + 9)^2$

3.  $(h + 3)^2$

4.  $(2s + 4)^2$

5.  $(3s + 1)^2$

6.  $(5s + 2)^2$

7.  $(a - 5)^2$

8.  $(k - 10)^2$

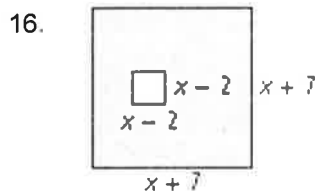
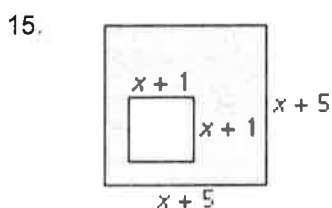
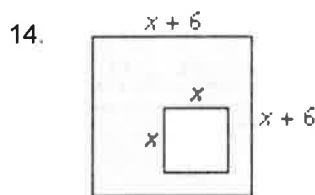
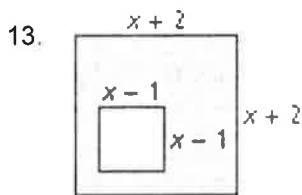
9.  $(n - 4)^2$

10.  $(3m - 4)^2$

11.  $(6m - 2)^2$

12.  $(4m - 2)^2$

The figures below are squares. Find an expression for the area of each shaded region. Write your answers in standard form.



17. A square brown tarp has a square green patch green in the corner. The side length of the tarp is  $(x + 8)$  and the side length of the patch is  $x$ . What is the area of the brown part of the tarp?

18. A square red placemat has a gold square in the center. The side length of the gold square is  $(x - 2)$  inches and the width of the red region is 4 inches. What is the area of the red part of the placemat?

## 8-4

**Practice** (continued)

Form G

**Multiplying Special Cases****Mental Math** Simplify each product.

19.  $48^2$

20.  $31^2$

21.  $29^2$

22.  $52^2$

23.  $63^2$

24.  $41^2$

25.  $89^2$

26.  $199^2$

27.  $302^2$

Simplify each product.

28.  $(v + 7)(v - 7)$

29.  $(b + 2)(b - 2)$

30.  $(z - 9)(z + 9)$

31.  $(x + 12)(x - 12)$

32.  $(8 + y)(8 - y)$

33.  $(t - 15)(t + 15)$

34.  $(m + 1)(m - 1)$

35.  $(a + 4)(a - 4)$

36.  $(5 + g)(5 - g)$

37.  $(p + 20)(p - 20)$

38.  $(f - 18)(f + 18)$

39.  $(2c + 3)(2c - 3)$

**Mental Math** Simplify each product.

40.  $61 \cdot 59$

41.  $27 \cdot 33$

42.  $202 \cdot 198$

43.  $74 \cdot 66$

44.  $597 \cdot 603$

45.  $85 \cdot 75$

Simplify each product.

46.  $(m + 4n)^2$

47.  $(3a + b)^2$

48.  $(6s - t)^2$

49.  $(s + 7t^2)^2$

50.  $(p^5 - 8q^3)^2$

51.  $(e^4 + f^2)^2$

52.  $(r^2 + 5s)(r^2 - 5s)$

53.  $(6p^2 + 2q)(6p^2 - 2q)$

54.  $(3w^4 - z^3)(3w^4 + z^3)$

55. **Error Analysis** Describe and correct the error made in simplifying the product.

$$\begin{aligned} & \cancel{(2x + 7)(2x - 7)} \\ & = 4x^2 - 28x - 49 \end{aligned}$$

56. The formula  $V = \frac{4}{3}\pi r^3$  gives the volume of a sphere with radius  $r$ . Find the volume of a sphere with radius  $x + 9$ . Write your answer in standard form.

# Key

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## 8-4

### Practice

Form G

#### Multiplying Special Cases

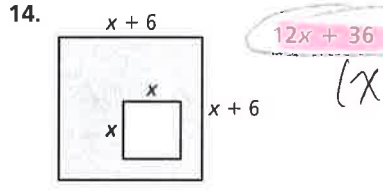
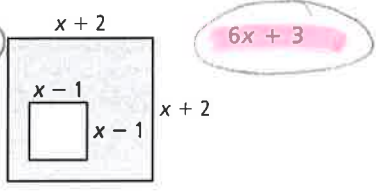
Simplify each expression.

- |                                       |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|
| 1. $(x + 7)^2$<br>$x^2 + 14x + 49$    | 2. $(w + 9)^2$<br>$w^2 + 18w + 81$    | 3. $(h + 3)^2$<br>$h^2 + 6h + 9$      |
| 4. $(2s + 4)^2$<br>$4s^2 + 16s + 16$  | 5. $(3s + 1)^2$<br>$9s^2 + 6s + 1$    | 6. $(5s + 2)^2$<br>$25s^2 + 20s + 4$  |
| 7. $(a - 5)^2$<br>$a^2 - 10a + 25$    | 8. $(k - 10)^2$<br>$k^2 - 20k + 100$  | 9. $(n - 4)^2$<br>$n^2 - 8n + 16$     |
| 10. $(3m - 4)^2$<br>$9m^2 - 24m + 16$ | 11. $(6m - 2)^2$<br>$36m^2 - 24m + 4$ | 12. $(4m - 2)^2$<br>$16m^2 - 16m + 4$ |

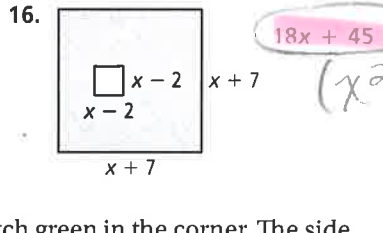
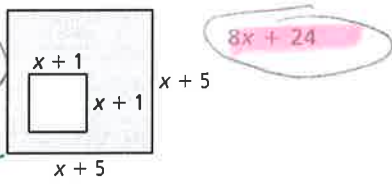
The figures below are squares. Find an expression for the area of each shaded region. Write your answers in standard form.

Shaded Area =  $lg \cdot Sq - Sm \cdot Sq$

13.  $(x^2 + 4x + 4) - (x^2 - 2x + 1)$   
 $6x + 3$  units<sup>2</sup>

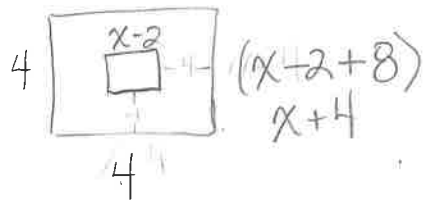
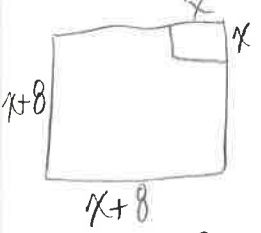


15.  $(x^2 + 10x + 25) - (x^2 + 2x + 1)$   
 $8x + 24$  units<sup>2</sup>



17. A square brown tarp has a square green patch green in the corner. The side length of the tarp is  $(x + 8)$  and the side length of the patch is  $x$ . What is the area of the brown part of the tarp?  
 $16x + 64$  units<sup>2</sup>

18. A square red placemat has a gold square in the center. The side length of the gold square is  $(x - 2)$  inches and the width of the red region is 4 inches. What is the area of the red part of the placemat?  
 $-x^2 + 4x + 12$  square inches



$(x^2 + 16x + 64) - x^2$   
 $16x + 64$

$8x(16) - (x^2 - 4x + 4)$   
 $-x^2 + 4x + 12$   
square inches

# 8-4

## Practice (continued)

Form G

### Multiplying Special Cases

**Mental Math** Simplify each product.

19.  $48^2$  2304

20.  $31^2$  961

21.  $29^2$  841

22.  $52^2$  2704

23.  $63^2$  3969

24.  $41^2$  1681

25.  $89^2$  7921

26.  $199^2$  39,601

27.  $302^2$  91,204

Simplify each product.

28.  $(v + 7)(v - 7)$

$v^2 - 49$

29.  $(b + 2)(b - 2)$

$b^2 - 4$

30.  $(z - 9)(z + 9)$

$z^2 - 81$

31.  $(x + 12)(x - 12)$

$x^2 - 144$

32.  $(8 + y)(8 - y)$

$64 - y^2$

33.  $(t - 15)(t + 15)$

$t^2 - 225$

34.  $(m + 1)(m - 1)$

$m^2 - 1$

35.  $(a + 4)(a - 4)$

$a^2 - 16$

36.  $(5 + g)(5 - g)$

$25 - g^2$

37.  $(p + 20)(p - 20)$

$p^2 - 400$

38.  $(f - 18)(f + 18)$

$f^2 - 324$

39.  $(2c + 3)(2c - 3)$

$4c^2 - 9$

**Mental Math** Simplify each product.

40.  $61 \cdot 59$

3599

41.  $27 \cdot 33$

891

42.  $202 \cdot 198$

39,996

43.  $74 \cdot 66$

4884

44.  $597 \cdot 603$

359,991

45.  $85 \cdot 75$

6375

Simplify each product.

46.  $(m + 4n)^2$

$m^2 + 8mn + 16n^2$

47.  $(3a + b)^2$

$9a^2 + 6ab + b^2$

48.  $(6s - t)^2$

$36s^2 - 12st + t^2$

49.  $(s + 7t)^2$

$s^2 + 14st + 49t^2$

50.  $(p^5 - 8q^3)^2$

$p^{10} - 16p^5q^3 + 64q^6$

51.  $(e^4 + f^2)^2$

$e^8 + 2e^4f^2 + f^4$

52.  $(r^2 + 5s)(r^2 - 5s)$

$r^4 - 25s^2$

53.  $(6p^2 + 2q)(6p^2 - 2q)$

$36p^4 - 4q^2$

54.  $(3w^4 - z^3)(3w^4 + z^3)$

$9w^8 - z^6$

55. **Error Analysis** Describe and correct the error made in simplifying the product.

The  $x$  terms should have a sum of zero.  $x^2 - 49$

56. The formula  $V = \frac{4}{3}\pi r^3$  gives the volume of a sphere with radius  $r$ . Find the volume of a sphere with radius  $x + 9$ . Write your answer in standard form.

$V = \frac{4}{3}\pi x^3 + 36\pi x^2 + 324\pi x + 972\pi$

~~$(2x + 7)(2x - 7)$   
 $= 4x^2 - 28x + 49$~~

should cancel out

$V = \frac{4}{3}\pi r^3$   
 $V = \frac{4}{3}\pi(x+9)^3$   
 $= \frac{4}{3}\pi(x^3 + 27x^2 + 81x + 729)$

$\frac{4}{3}\pi(x^3 + 27x^2 + 81x + 729)$   
 $\frac{4}{3}\pi(x^3 + 27x^2 + 243x + 729)$

$V = \frac{4}{3}\pi x^3 + 36\pi x^2 + 324\pi x + 972\pi$   
 $V = 4.19x^3 + 113.1x^2 + 1017.88x + 3053.63$