Practice

8-3

Multiplying Binomials

Form G

Simplify each product using the Distributive Property.

1. $(x + 3)(x + 8)$

2. $(y - 4)(y + 7)$

3. $(m + 9)(m - 3)$

4. $(c - 6)(c - 4)$

5. $(2r - 5)(r + 3)$

6. $(3x + 1)(5x - 3)$

7. $(d + 2)(4d - 3)$

8. $(5t - 1)(3t - 2)$

9. $(a + 11)(11a + 1)$

Simplify each product using a table.

10. $(x + 3)(x - 5)$

11. $(a - 2)(a - 13)$

12. $(w - 4)(w + 8)$

13. $(5h - 3)(h + 7)$

14. $(x - 3)(2x + 3)$

15. $(2p + 1)(6p + 4)$

Simplify each product using the FOIL method.

16. $(2x - 6)(x + 3)$

17. $(n - 5)(3n - 4)$

18. $(4p^2 + 2)(3p - 1)$

19. $(a + 7)(a - 3)$

20. $(x + 3)(3x - 2)$

21. $(k - 9)(k + 5)$

22. $(b - 5)(b - 11)$

23. $(4m - 1)(m + 4)$

24. $(7z + 3)(4z - 6)$

25. $(2h + 6)(5h - 3)$

26. $(3w + 12)(w + 3)$

27. $(6c - 2)(9c - 8)$

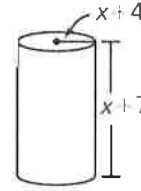## Practice (continued)   Form G

8-3

Multiplying Binomials *SA of a cylinder* $= 2\pi rh + 2\pi r^2$

SHOW all work on loose-leaf

28. What is the surface area of the cylinder at the right? Write your answer in simplified form.

29. The radius of a cylindrical popcorn tin is $(3x + 1)$ in. The height of the tin is three times the radius. What is the surface area of the cylinder? Write your answer in simplified form.

30. The radius of a cylindrical tennis ball can is $(2x + 1)$ cm. The height of the tennis ball can is six times the radius. What is the surface area of the cylinder? Write your answer in simplified form.

x + 4

x + 7

Simplify each product.

31. $(x + 3)(x^2 - 2x + 4)$

32. $(k^2 - 5k + 2)(k - 5)$

33. $(3a^2 + a + 4)(2a - 6)$

34. $(2x^2 + 2x - 6)(3x - 4)$

35. $(4g + 5)(2g^2 - 7g + 3)$

36. $(m^2 - 2m + 7)(3m + 6)$

37. $(2c + 8)(2c^2 - 4c - 1)$

38. $(t + 8)(3t^2 + 4t + 5)$

39. A medical center's rectangular parking lot currently has a length of 30 meters and a width of 20 meters. The center plans to expand both the length and the width of the parking lot by $2x$ meters. What polynomial in standard form represents the area of the expanded parking lot?

40. Error Analysis Describe and correct the error made in finding the product.

SHOW ALL WORK ON LOOSE LEAF

$(2x - 3)(x + 7)$

	x	7
$2x$	$2x^2$	$14x$
3	$3x$	21

$2x^2 + 17x + 21$

41. Multi Step The height of a painting is twice its width x. You want a 3 inch wide wooden frame for the painting. The area of the frame alone is 216 square inches.

  a. Draw a diagram that represents this situation.
  b. Write a variable expression for the area of the frame alone.

  c. What are the dimensions of the frame?

Name _____ **Key** _____ Class _____ Date _____

8-3

Practice

Form G

Multiplying Binomials

Simplify each product using the Distributive Property.

1. $(x + 3)(x + 8)$

$x^2 + 11x + 24$

2. $(y - 4)(y + 7)$

$y^2 + 3y - 28$

3. $(m + 9)(m - 3)$

$m^2 + 6m - 27$

4. $(c - 6)(c - 4)$

$c^2 - 10c + 24$

5. $(2r - 5)(r + 3)$

$2r^2 + r - 15$

6. $(3x + 1)(5x - 3)$

$15x^2 - 4x - 3$

7. $(d + 2)(4d - 3)$

$4d^2 + 5d - 6$

8. $(5t - 1)(3t - 2)$

$15t^2 - 13t + 2$

9. $(a + 11)(11a + 1)$

$11a^2 + 122a + 11$

Simplify each product using a table.

10. $(x + 3)(x - 5)$

$x^2 - 2x - 15$

11. $(a - 2)(a - 13)$

$a^2 - 15a + 26$

12. $(w - 4)(w + 8)$

$w^2 + 4w - 32$

13. $(5h - 3)(h + 7)$

$5h^2 + 32h - 21$

14. $(x - 3)(2x + 3)$

$2x^2 - 3x - 9$

15. $(2p + 1)(6p + 4)$

$12p^2 + 14p + 4$

Simplify each product using the FOIL method.

16. $(2x - 6)(x + 3)$

$2x^2 - 18$

17. $(n - 5)(3n - 4)$

$3n^2 - 19n + 20$

18. $(4p^2 + 2)(3p - 1)$

$12p^3 - 4p^2 + 6p - 2$

19. $(a + 7)(a - 3)$

$a^2 + 4a - 21$

20. $(x + 3)(3x - 2)$

$3x^2 + 7x - 6$

21. $(k - 9)(k + 5)$

$k^2 - 4k - 45$

22. $(b - 5)(b - 11)$

$b^2 - 16b + 55$

23. $(4m - 1)(m + 4)$

$4m^2 + 15m - 4$

24. $(7z + 3)(4z - 6)$

$28z^2 - 30z - 18$

25. $(2h + 6)(5h - 3)$

$10h^2 + 24h - 18$

26. $(3w + 12)(w + 3)$

$3w^2 + 21w + 36$

27. $(6c - 2)(9c - 8)$

$54c^2 - 66c + 16$

8-3 Practice (continued)   Form G

Multiplying Binomials

28. What is the surface area of the cylinder at the right? Write your answer in simplified form.

$4\pi x^2 + 38\pi x + 88\pi$

Handwritten at right:
$A = 2\pi rh + 2\pi r^2$
$= 2\pi(x+4)(x+7)$
$x+7 = 2\pi(x^2+11x+28) +$
$2\pi(x+4)^2$
$= 2\pi x^2 + 11x + 28 +$
$2\pi(x^2$
label: $x+4$

29. The radius of a cylindrical popcorn tin is $(3x + 1)$ in. The height of the tin is three times the radius. What is the surface area of the cylinder? Write your answer in simplified form.

$72\pi x^2 + 48\pi x + 8\pi$

30. The radius of a cylindrical tennis ball can is $(2x + 1)$ cm. The height of the tennis ball can is six times the radius. What is the surface area of the cylinder? Write your answer in simplified form.

$56\pi x^2 + 56\pi x + 14\pi$

Simplify each product.

31. $(x + 3)(x^2 - 2x + 4)$

$x^3 + x^2 - 2x + 12$

32. $(k^2 - 5k + 2)(k - 5)$

$k^3 - 10k^2 + 27k - 10$

33. $(3a^2 + a + 4)(2a - 6)$

$6a^3 - 16a^2 + 2a - 24$

34. $(2x^2 + 2x - 6)(3x - 4)$

$6x^3 - 2x^2 - 26x + 24$

35. $(4g + 5)(2g^2 - 7g + 3)$

$8g^3 - 18g^2 - 23g + 15$

36. $(m^2 - 2m + 7)(3m + 6)$

$3m^3 + 9m + 42$

37. $(2c + 8)(2c^2 - 4c - 1)$

$4c^3 + 8c^2 - 34c - 8$

38. $(t + 8)(3t^2 + 4t + 5)$

$3t^3 + 28t^2 + 37t + 40$

39. A medical center's rectangular parking lot currently has a length of 30 meters and a width of 20 meters. The center plans to expand both the length and the width of the parking lot by $2x$ meters. What polynomial in standard form represents the area of the expanded parking lot?

$4x^2 + 100x + 600$

Handwritten at right:
labels: 30, 20, $20+2x$, $30+2x$
$(30+2x)(20+2x)$
$600 + 60x + 40x + 4x^2$
$4x^2 + 100x + 600$

40. Error Analysis Describe and correct the error made in finding the product.

In the table, the 3 should be -3. Therefore, $3x$ should be $-3x$ and 21 should be -21. The answer is $2x^2 + 11x - 21$.

$(2x - 3)(x + 7)$

	x	7
$2x$	$2x^2$	$14x$
3	$3x$	21

$2x^2 + 17x + 21$

41. Multi Step The height of a painting is twice its width x. You want a 3 inch wide wooden frame for the painting. The area of the frame alone is 216 square inches.

a. Draw a diagram that represents this situation.

b. Write a variable expression for the area of the frame alone.

$18x + 36$

c. What are the dimensions of the frame? length is 26; width is 16

Handwritten: $(2 \cdot 10 + 6)$ $(10 + 6)$

labels on diagram: $+3$, $2x+3$, $2x+6$ frame, x, $+$ frame

Handwritten work at bottom:

$216 = 18x + 36$
$-36 \quad -36$
$180 = 18x$
$10 = x$

$A = (2x)x$
$A = 2x^2$

$A = \ell \cdot w$
$A = (x+6)(2x+6)$
$A = 2x^2 + 6x + 12x + 36$
$2x^2 + 18x + 36$
$18x + 36$

28) $SA = 2\pi rh + 2\pi r^2$

$SA = 2\pi(x+4)(x+7) + 2\pi(x+4)^2$

$SA = 2\pi(x^2 + 11x + 28) + 2\pi(x^2 + 8x + 16)$

$SA = 2\pi x^2 + 22\pi x + 56\pi + 2\pi x^2 + 16\pi x + 32\pi$

$A = 4\pi x^2 + 38\pi x + 88\pi$

29) $R = 3x+1$

$h = 3(3x+1)$ or $9x+3$

$SA = 2\pi rh + 2\pi r^2$

$SA = 2\pi(3x+1)(9x+3) + 2\pi(3x+1)(3x+1)$

$SA = 2\pi(27x^2 + \underset{18x}{9x + 9x} + 3) + 2\pi(9x^2 + \underset{6x}{3x + 3x} + 1)$

$SA = 54\pi x^2 + 36\pi x + 6\pi + 18\pi x^2 + 12\pi x + 2\pi$

$SA = 72\pi x^2 + 48\pi x + 8\pi$

30) $R = (2x+1)$

$h = 6(2x+1)$ or $(12x+6)$

$SA = 2\pi rh + 2\pi r^2$

$SA = 2\pi(2x+1)(12x+6) + 2\pi(2x+1)(2x+1)$

$SA = 2\pi(24x^2 + \underset{24x}{12x + 12x} + 6) + 2\pi(4x^2 + 4x + 1)$

$SA = 48\pi x^2 + 48\pi x + 12\pi + 8\pi x^2 + 8\pi x + 2\pi$

$SA = 56\pi x^2 + 56\pi x + 14\pi$