pp. 376-377, #1-7 odd, #17-53 odd, #58, #60

1. $2c(5c^2) = 10c^3$

3. $$\begin{aligned} -4r^2(9r + 6) &= -4r^2(9r) - 4r^2(6) \\ &= -36r^3 - 24r^2 \end{aligned}$$

5. $$\begin{aligned} 7w^3(w^2 - 4w - 1) &= 7w^3(w^2) + 7w^3(4w) + 7w^3(-1) \\ &= 7w^5 + 28w^4 - 7w^3 \end{aligned}$$

7. $$\begin{aligned} (15 - 3g^2)(8g^5) &= (15)(8g^5) + (-3g^2)(8g^5) \\ &= 120g^5 - 24g^7 \\ &= -24g^7 + 120g^5 \end{aligned}$$

17. $$\begin{aligned} (x + 1)(x + 3) &= x(x + 3) + 1(x + 3) \\ &= x(x) + x(3) + 1(x) + 1(3) \\ &= x^2 + 3x + x + 3 \\ &= x^2 + 4x + 3 \end{aligned}$$

19. $$\begin{aligned} (z - 5)(z + 3) &= z(z + 3) - 5(z + 3) \\ &= z(z) + z(3) - 5(z) - 5(3) \\ &= z^2 + 3z - 5z - 15 \\ &= z^2 - 2z - 15 \end{aligned}$$

21. $\left(g - \frac{1}{2}\right)\left(g - \frac{3}{2}\right) = g\left(g - \frac{3}{2}\right) - \frac{1}{2}\left(g - \frac{3}{2}\right)$

$= g(g) + g\left(-\frac{3}{2}\right) - \frac{1}{2}(g) - \frac{1}{2}\left(-\frac{3}{2}\right)$

$= g^2 - \frac{3}{2}g - \frac{1}{2}g + \frac{3}{4}$

$= g^2 - 2g + \frac{3}{4}$

23. $(3m + 1)(m + 9) = 3m(m + 9) + 1(m + 9)$

$= 3m(m) + 3m(9) + 1(m) + 1(9)$

$= 3m^2 + 27m + m + 9$

$= 3m^2 + 28m + 9$

25. $(x + 3)(x + 2)$

	x	3
x	x^2	$3x$
2	$2x$	6

$x^2 + 3x + 2x + 6 = x^2 + 5x + 6$

27. $(3k - 1)(4k + 9) = [3k + (-1)](4k + 9)$

	$3k$	-1
$4k$	$12k^2$	$-4k$
9	$27k$	-9

$12k^2 - 4k + 27k - 9 = 12k^2 + 23k - 9$

29. $(-3 + 2j)(4j - 7) = [2j + (-3)][4j + (-7)]$

	$2j$	-3
$4j$	$8j^2$	$-12j$
$-7j$	$-14j$	21

$8j^2 - 12j - 14j + 21 = 8j^2 - 26j + 21$

31.

$$\begin{aligned} & \qquad\quad \text{First} \quad \text{Outer} \quad \text{Inner} \quad \text{Last} \\ (b + 3)(b + 7) &= b(b) + b(7) + 3(b) + 3(7) \\ &= b^2 + 7b + 3b + 21 \\ &= b^2 + 10b + 21 \end{aligned}$$

33.

$$\begin{aligned} & \qquad\quad \text{First} \quad \text{Outer} \quad \text{Inner} \quad \text{Last} \\ (k + 5)(k - 1) &= k(k) + k(-1) + 5(k) + 5(-1) \\ &= k^2 - k + 5k - 5 \\ &= k^2 + 4k - 5 \end{aligned}$$

35.

$$\begin{aligned} & \qquad\quad \text{First} \quad \text{Outer} \quad \text{Inner} \quad \text{Last} \\ \left(q - \tfrac{3}{4}\right)\left(q + \tfrac{1}{4}\right) &= q(q) + q\left(\tfrac{1}{4}\right) + \left(-\tfrac{3}{4}\right)(q) + \left(-\tfrac{3}{4}\right)\left(\tfrac{1}{4}\right) \\ &= q^2 + \tfrac{1}{4}q - \tfrac{3}{4}q - \tfrac{3}{16} \\ &= q^2 - \tfrac{1}{2}q - \tfrac{3}{16} \end{aligned}$$

37. First Outer Inner Last

$$\begin{aligned}(9 - r)(2 - 3r) &= 9(2) + 9(-3r) + (-r)(2) + (-r)(-3r)\\ &= 18 - 27r - 2r + 3r^2\\ &= 18 - 29r + 3r^2\\ &= 3r^2 - 29r + 18\end{aligned}$$

39. First Outer Inner Last

$$\begin{aligned}(w + 5)(w^2 + 3w) &= w(w^2) + w(3w) + 5(w^2) + 5(3w)\\ &= w^3 + 3w^2 + 5w^2 + 15w\\ &= w^3 + 8w^2 + 15w\end{aligned}$$

41. The first term t also should be multiplied by $t + 5$.

$$\begin{aligned}(t - 2)(t + 5) &= t(t + 5) - 2(t + 5)\\ &= t(t) + t(5) - 2(t) - 2(5)\\ &= t^2 + 5t - 2t - 10\\ &= t^2 + 3t - 10\end{aligned}$$

43. $A = \ell w$

$$= (2x - 9)(x + 5)$$

F O I L

$$\begin{aligned}&= 2x(x) + 2x(5) + (-9)(x) + (-9)(5)\\ &= 2x^2 + 10x - 9x - 45\\ &= 2x^2 + x - 45\end{aligned}$$

The polynomial $2x^2 + x - 45$ represents the area of the rectangular region.

45.

Area of shaded region	=	Area of rectangular region	−	Area of triangular region

$$A = \ell w - \tfrac{1}{2}bh$$

$$= (x + 6)(x + 5) - \tfrac{1}{2}(x + 6)(x + 5)$$

F O I L F O I L

$$= [x(x) + x(5) + 6(x) + 6(5)] - \tfrac{1}{2}[x(x) + x(5) + 6(x) + 6(5)]$$

$$= (x^2 + 5x + 6x + 30) - \tfrac{1}{2}(x^2 + 5x + 6x + 30)$$

$$= (x^2 + 11x + 30) - \tfrac{1}{2}(x^2 + 11x + 30)$$

$$= x^2 + 11x + 30 - \tfrac{1}{2}(x^2) - \tfrac{1}{2}(11x) - \tfrac{1}{2}(30)$$

$$= x^2 + 11x + 30 - \tfrac{1}{2}x^2 + \tfrac{11}{2}x - 15$$

$$= \left(x^2 - \tfrac{1}{2}x^2\right) + \left(11x - \tfrac{11}{2}x\right) + (30 - 15)$$

$$= \tfrac{1}{2}x^2 + \tfrac{11}{2}x + 15$$

The polynomial $\frac{1}{2}x^2 + \frac{11}{2}x + 15$ represents the area of the shaded region.

47.

$$\begin{array}{r} x^2 + 3x + 2 \\ \times \qquad\qquad x + 4 \\ \hline 4x^2 + 12x + 8 \\ x^3 + 3x^2 + 2x \qquad \\ \hline x^3 + 7x^2 + 14x + 8 \end{array}$$

49.

$$\begin{array}{r} y^2 + 8y - 2 \\ \times \qquad\qquad y + 3 \\ \hline 3y^2 + 24y - 6 \\ y^3 + 8y^2 - 2y \qquad \\ \hline y^3 + 11y^2 + 22y - 6 \end{array}$$

51.

$$\begin{array}{r} 5b^2 + 5b - 4 \\ \times \qquad\qquad -b + 4 \\ \hline 20b^2 + 20b - 16 \\ -5b^3 - 5b^2 + 4b \qquad \\ \hline -5b^3 + 15b^2 + 24b - 16 \end{array}$$

53.

$$\begin{array}{r} 3e^2 - 5e + 7 \\ \times \qquad\qquad 6e + 1 \\ \hline 3e^2 - 5e + 7 \\ 18e^3 - 30e^2 + 42e \qquad \\ \hline 18e^3 - 27e^2 + 37e + 7 \end{array}$$

58. The FOIL method can only be used for multiplying two binomials, because each of the four letters represent one of the products when two binomials are multiplied. When a binomial and trinomial are multiplied, there are 4 products, and when two trinomials are multiplied, there are 6 products. The FOIL method would leave out the products that include the middle terms of the trinomials.

60. $(2x - 1)(3x + 4) = ax^2 + bx + c$

$$\begin{aligned}(2x - 1)(3x + 4) &= 2x(3x) + 2x(4) - 1(3x) - 1(4)\\ &= 6x^2 + 8x - 3x - 4\\ &= 6x^2 + 5x - 4\end{aligned}$$

$6x^2 + 5x - 4 = ax^2 + bx + c$, $a = 6$, $b = 5$, and $c = -4$.