Part A: Simplifying and Classifying Polynomials

Practice 1

1.
Standard form: $2x - 8$
Classification: linear binomial
Leading coefficient: 2

2.
Standard form: $-x^3 - 3x^2 + 2x + 1$
Classification: cubic polynomial with 4 terms
Leading coefficient: -1

3.
Standard form: $11x^2 + x + 6$
Classification: quadratic trinomial
Leading coefficient: 11

4.
Standard form: x
Classification: linear monomial
Leading coefficient: 1

5.
The degree of a polynomial is the largest exponent in the expression. The leading coefficient is the number in front of the term with the largest degree.

6.
$(-x + 17 + 23x^2) + (-3x^2 - 1 - x)$
$20x^2 - 2x + 16$

7.
$(x^2 + 3x - 8) - (3x^2 + 6x - 2)$
$x^2 + 3x - 8 - 3x^2 - 6x + 2$
$-2x^2 - 3x - 6$

8.
$(x^2 - 16) - (19x^2 + 3x - 2)$
$x^2 - 16 - 19x^2 - 3x + 2$
$-18x^2 - 3x - 14$

9.

$(x^2 - 5x + 8) - (x^2 - 5x + 15)$

$x^2 - 5x + 8 - x^2 + 5x - 15$

-7

10.

$P = a + b + c;\ a = x^3 - 8x + 9,\ b = 4x^3 + 10x,\ c = 10x + 8$

$P = (x^3 - 8x + 9) + (4x^3 + 10x) + (10x + 8)$

$P = 5x^3 + 12x + 17$ units

11.

$(Rx^2 - 7x - 8) - (6x^2 + 2) = 3x^2 - 7x - 10$

$Rx^2 - 6x^2 = 3x^2$

$R - 6 = 3$

$R - 6 + 6 = 3 + 6$

$R = 9$

12.

$(12x^2 + 11x + 10) + (Rx^2 - 10) = 2x^2 + 11x$

$12x^2 + Rx^2 = 2x^2$

$12 + R = 2$

$12 - 12 + R = 2 - 12$

$R = -10$

Practice 2

1.

Standard form: $x^2 - 3x + 5$
Classification: quadratic trinomial
Leading coefficient: 1

2.

Standard form: $3x^2 - 16$
Classification: quadratic binomial
Leading coefficient: 3

3.

Standard form: $-7x^2 - 16x + 37$
Classification: quadratic trinomial
Leading coefficient: -7

4.
Degree: degree 0
Leading coefficient: 5
Constant: 5

5.
Degree: degree 2
Leading coefficient: 7
Constant: −22

6.
$(5x^2 - 2x) + (8x^2 - 11)$
$13x^2 - 2x - 11$

7.
$(x^2 + 13x + 20) - (x^2 + 22x - 3)$
$x^2 + 13x + 20 - x^2 - 22x + 3$
$-9x + 23$

8.
$(x^2 - 4x - 7) - (3x^2 - 2x - 1)$
$x^2 - 4x - 7 - 3x^2 + 2x + 1$
$-2x^2 - 2x - 6$

9.
$(5x^2 - 11x + 8) + (x^2 + 3x + 2)$
$6x^2 - 8x + 10$

10.
$(x^3 - x^2 - x - 1) + (3x + 8)$
$x^3 - x^2 + 2x + 7$

11.
$P = a + b + c;\ a = 3x^2,\ b = x^2 + 5x + 19,\ c = 7x - 1$
$P = (3x^2) + (x^2 + 5x + 19) + (7x - 1)$
$P = 4x^2 + 12x + 18$ units

12.

$$(Rx + 2) + (x^2 - 9) = x^2 + 5x - 7$$
$$Rx = 5x$$
$$R = 5$$

13.

$$(x^2 + 3x - 3) - (x^2 + Rx - 3) = -5x$$
$$3x - Rx = -5x$$
$$3 - R = -5$$
$$3 - 3 - R = -5 - 3$$
$$-R = -8$$
$$R = 8$$

Part B: Products of Polynomials

Practice 1

1.

$A = lw;\ l = 3x,\ w = (2x^2 - x + 8)$

$3x\,(2x^2 - x + 8)$

$6x^3 - 3x^2 + 24x$ square units

2.

$(4x^2 - 5x - 3)(11x^2)$

$44x^4 - 55x^3 - 33x^2$

3.

$x^2 + 1x + 3x + 3$

$x^2 + 4x + 3$

4.

$4x^2 + 8x + 1x + 2$

$4x^2 + 9x + 2$

5.

$4x^2 + 2x + 6x + 3$

$4x^2 + 8x + 3$

6.

$3x^2 + 2x + 12x + 8$

$3x^2 + 14x + 8$

7.

$x^2 - 7x - 12x + 84$

$x^2 - 19x + 84$

8.

$8x^2 - 10x - 28x + 35$

$8x^2 - 38x + 35$

9.

$3x^2 - 8x - 18x + 48$

$3x^2 - 26x + 48$

10.

$5x^2 + 50x - 3x - 30$

$5x^2 + 47x - 30$

11.

$x^2 - 13x + 2x - 26$

$x^2 - 11x - 26$

12.

$56x^2 + 21x - 16x - 6$

$56x^2 + 5x - 6$

13.

$A = lw;\ l = 7x + 1,\ w = y - 3$

$A = (7x + 1)(y - 3)$

$A = 7xy - 21x + 1y - 3$ square units

14.

$(3x - 8)(3x^2 + 2x + 1)$

$9x^3 + 6x^2 + 3x - 24x^2 - 16x - 8$

$9x^3 - 18x^2 - 13x - 8$

15.

$(6x + 7)(x^2 + 2x + 3)$

$6x^3 + 12x^2 + 18x + 7x^2 + 14x + 21$

$6x^3 + 19x^2 + 32x + 21$

16.

$(2x^2 - x + 6)(x^2 + 5x + 6)$

$2x^4 - x^3 + 6x^2 + 10x^3 - 5x^2 + 30x + 12x^2 - 6x + 36$

$2x^4 + 9x^3 + 13x^2 + 24x + 36$

17.

$(2x - 11)(Qx + 2) = 10x^2 - 51x - 22$

$(2x)(Qx) = 10x^2$

$2 \cdot Q = 10;\ Q = 5$

18.

$$(4x^2 + Qx + 7)(3x + 5) = 12x^3 + 26x^2 + 31x + 35$$

$$20x^2 + 5Qx + 35 + 12x^3 + 3Qx^2 + 21x = 12x^3 + 26x^2 + 31x + 35$$

$$5Qx + 21x = 31x$$

$$5Q + 21 = 31$$

$$5Q = 10$$

$$Q = 2$$

19.

$A = \frac{1}{2}bh;\ b = 2x^2 - 6x + 18,\ h = 3x - 1$

$A = \frac{1}{2}(2x^2 - 6x + 18)(3x - 1)$

$A = \frac{1}{2}(6x^3 - 18x^2 + 54x - 2x^2 + 6x - 18) = \frac{1}{2}(6x^3 - 20x^2 + 60x - 18)$

$A = 3x^3 - 10x^2 + 30x - 9$ square feet

Practice 2

1.

$P = 2L + 2w;\ l = x^2 + 3x,\ w = 5x - 1$

$P = 2(x^2 + 3x) + 2(5x - 1)$

$P = 2x^2 + 6x + 10x - 2$

$P = 2x^2 + 16x - 2$ feet

2.

$x^2 + 1x - 8x - 8$

$x^2 - 7x - 8$

3.

$2x^2 - 8x + 5x - 20$

$2x^2 - 3x - 20$

4.

$9x^2 + 12x + 12x + 16$

$9x^2 + 24x + 16$

5.

$6x^2 + 54x - 7x - 63$

$6x^2 + 47x - 63$

6.

$x^2 - 12x + 12x - 144$

$x^2 - 144$

7.

$25x^2 + 5x - 5x - 1$

$25x^2 - 1$

8.

$64x^2 + 8xy - 8xy - y^2$

$64x^2 - y^2$

9.

$4x^2 - 14x + 14x - 49$

$4x^2 - 49$

10.

$A = \frac{1}{2}bh;\ b = 3x + 8,\ h = 2x - 1$

$A = \frac{1}{2}(3x + 8)(2x - 1)$

$A = \frac{1}{2}(6x^2 - 3x + 16x - 8)$

$A = 3x^2 + \frac{13}{2}x - 4$ square cm

11.

$3x^2 + 8x - 12x - 32$

$3x^2 - 4x - 32$

12.

$10x^2 - 35x - 22x + 77$

$10x^2 - 57x + 77$

13.

$x^2 + xy + xy + y^2$

$x^2 + 2xy + y^2$

14.

$8x^2 - 10xy + 12xy - 15y^2$

$8x^2 + 2xy - 15y^2$

15.

$2Qx^3 - 6x^2 - 18x - 3Qx^2 + 9x + 27 = 10x^3 - 21x^2 - 9x + 27$

$2Qx^3 = 10x^3$

$2Q = 10$

$Q = 5$

16.

$11x^3 + 5x^2 - 13x + 22x^2 + 10x - 26$

$11x^3 + 27x^2 - 3x - 26$

17.

$x^4 - 4x^3 + 3x^2 + 6x^3 - 24x^2 + 18x - 7x^2 + 28x - 21$

$x^4 + 2x^3 - 28x^2 + 46x - 21$

18.

$8Qx^2 - 16x + 7Qx - 14$

$8Qx^2 = 24x^2$

$8Q = 24;\ Q = 3$

19.

$15x^3 + 20x^2 - 1x - 30x^2 - 40x + 2$

$15x^3 - 10x^2 - 41x + 2$

20.

$SA = 2(lw + lh + wh);\ l = 2x + 5,\ w = x + 3,\ h = x + 1$

$lw = (2x + 5)(x + 3) = 2x^2 + 6x + 5x + 15 \quad = 2x^2 + 11x + 15$

$lh = (2x + 5)(x + 1) = 2x^2 + 2x + 5x + 5 \quad = 2x^2 + 7x + 5$

$wh = (x + 3)(x + 1) = x^2 + 1x + 3x + 3 \quad = x^2 + 4x + 3$

Add the like terms together before distributing the 2 across the terms.

$SA = 2(5x^2 + 22x + 23)$

$SA = 10x^2 + 44x + 46$ square units

Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12
Lesson Origin	19	19	19	19	19	2	2	2	2	18	1, FS	19

1.

$(2xy^2)(3xy^2)$
$2 \cdot 3 \cdot x^{1+1} y^{2+2}$
$6x^2y^4$

2.

$5^{1 \cdot 2} \cdot a^{3 \cdot 2} b^{11 \cdot 2} c^{3 \cdot 2}$
$5^2a^6b^{22}c^6$
$25a^6b^{22}c^6$

3.

$2^1m^5 \cdot 2^{8 \cdot 5} m^{4 \cdot 5}n^{7 \cdot 5}$
$2^{1+40}m^{5+20}n^{35}$
$2^{41}m^{25}n^{35}$

4.

$l = 3xy^5$, $w = 11y$
$A = lw$
$A = (3xy^5)(11y)$
$A = 3 \cdot 11xy^{5+1}$
$A = 33xy^6$ square units

5.

$b = 4x$, $h = 4x$
$A = \frac{1}{2}bh$
$A = \frac{1}{2}(4x)(4x)$
$A = \frac{1}{2}(4 \cdot 4x^{1+1})$
$A = \frac{1}{2}(16)x^2$
$A = 8x^2$ square feet

6.

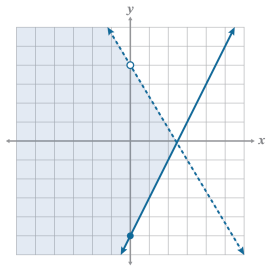
$4(x - 7) = 2$ (Distributive)
$4x - 28 = 2$ (Addition Property of Equality)
$4x = 30$ (Multiplication Property of Equality)
$x = \frac{30}{4}$ (simplify fraction)
$x = \frac{15}{2}$

7.
$10(\frac{13}{5} = \frac{5}{2}x - \frac{31}{5})$
$26 = 25x - 62x$
$26 = -37x$
$x = -\frac{26}{37}$

8.
$5n - n + 3n + 8$
$7n + 8$

9.
(gallons of gas, cost)
(9, 29.25), (5, 16.25)
$m = \frac{(29.25 - 16.25)}{(9 - 5)}$
$m = \frac{13}{4} = \frac{3.25}{1}$
One gallon of gas costs $3.25.

10.



11. B
A. Associative Property
B. Commutative Property
C. Distributive Property
D. Inverse Property

12. D
A. $5x^3y^2$ Added the coefficient rather than multiplying
B. $5xy$ Added the coefficient and ignored the exponents
C. $6xy$ Ignored the exponents
D. $6x^3y^2$

$(3xy)(2x^2y) = 3 \cdot 2 \cdot x^{(1+2)}y^{(1+1)} = 6x^3y^2$