Part A: Greatest Common Monomial Factors

Practice 1

1.

$-3y$

2.

$5pq$

3.

$5x$

4.

GCF: $3x^4$

5.

GCF: $15x$

6.

GCF: y^2

7.

$5x\,(x^2 - 11)$

8.

$x^3\,(2x - xy + 7y)$

9.

$8x\,(7x - 8)$

10.

$y^n\left(y^g - y^h\right)$

11.

$y^{6n}\,(1 + y^{6n})$

12.

$-2x\,(5x^2 - 2x - 9)$

Practice 2

1.

$8a^6$

2.

$12xy^2$

3.

GCF:$-\ 2x$

4.

GCF: $4x$

5.

GCF: $-\ x^2$

6.

GCF: x^3

7.

$18x\ (x\ -\ 1)$

8.

$-\ 1\ (x^2\ -\ 2x\ +\ 29)$

9.

$y^n\left(y^b + y^c\right)$

10.

$2(x^2\ +\ 5x\ +\ 7)$

11.

$x^3y^2\ (x^2\ +\ y\ +\ 5)$

12.

$13xy\ (2x\ -\ 3)$

Part B: Factoring by Grouping

Practice 1

1.

$(x - 2)$

2.

$(5x + 4)$

3.

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

4.

$(m + 2)(11x + 7)$

5.

$x(a - 6) + 2(-a + 6)$
$x(a - 6) - 2(a - 6)$
$(x - 2)(a - 6)$

6.

$3(5x - 1) - 8x(-5x + 1)$
$3(5x - 1) - 8x(-1)(5x - 1)$
$(5x - 1)(8x + 3)$

7.

$(24x^2 - 4xy) + (30x - 5y)$
$4x(6x - y) + 5(6x - y)$
$(4x + 5)(6x - y)$

8.

$(10x^2 - 15x) + (-2x + 3)$
$5x(2x - 3) - 1(2x - 3)$
$(5x - 1)(2x - 3)$

9.

$(5x^2y + xy) + (-5x - 1)$
$xy(5x + 1) - 1(5x + 1)$
$(5x + 1)(xy - 1)$

10.
$(56xy - 16ry) + (10r - 35x)$
$8y(7x - 2r) + 5(2r - 7x)$
$8y(7x - 2r) + 5(-7x + 2r)$
$8y(7x - 2r) - 5(7x - 2r)$
$(8y - 5)(7x - 2r)$

11.
$(3x^2 + 21xy) + (5x + 35y)$
$3x(x + 7y) + 5(x + 7y)$
$(3x + 5)(x + 7y)$
The side lengths are $(3x + 5)$ and $(x + 7y)$ units.

12.
Factoring is the inverse of the distributive property. When you distribute, you find the product of terms. Factoring takes the given product and looks for the factors.

Practice 2

1.
$(7x - 8)$

2.
$(a + 5)$

3.
$(2x - 9)(x + 3)$

4.
$(8x - 7)(5x - 7)$

5.
$2x(y - 8) + 3(-y + 8)$
$2x(y - 8) - 3(y - 8)$
$(2x - 3)(y - 8)$

6.
$5(-x + 9) + x(x - 9)$
$-5(x - 9) + x(x - 9)$
$(x - 9)(x - 5)$

7.

Finding the greatest common factor among terms is the first step in factoring. When looking at the right side of the equations you can see that all terms are multiplied by a. If you rewrite the products as their factors you would get the left side of the equations. This shows that factoring and distributing are inverses.

8.

$(15x^2 + 12x) + (20xy + 16y)$
$3x(5x + 4) + 4y(5x + 4)$
$(3x + 4y)(5x + 4)$

9.

$(4xy - 24y) + (6 - x)$
$4y(x - 6) + (-x + 6)$
$4y(x - 6) - 1(x - 6)$
$(4y - 1)(x - 6)$

10.

$(21x^2y - 9xy) + (-14x + 6)$
$3xy(7x - 3) - 2(7x - 3)$
$(7x - 3)(3xy - 2)$

11.

$(8xy - 2y) + (-15 + 60x)$
$2y(4x - 1) + (60x - 15)$
$2y(4x - 1) + 15(4x - 1)$
$(4x - 1)(2y + 15)$
The side lengths of a rectangle are $4x - 1$ and $2y + 15$ units.

12.

$(21x^2 + 9x) + (-42x - 18)$
$3x(7x + 3) - 6(7x + 3)$
$(3x - 6)(7x + 3)$
$3(x - 2)(7x + 3)$

Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12
Lesson Origin	20	20	20	20	20	19	19	19	2	18	20	20

1.

$36x^2 + 6x - 6x - 1$

$36x^2 - 1$

2.

$36x^2 - 6x - 6x + 1$

$36x^2 - 12x + 1$

3.

Grey rectangle – white rectangle = only grey space

$(5x^2 + 6x + 30) - (x^2 + 2x + 13)$

$4x^2 + 4x + 17$

4.

$A = (x + 6)(x - 2)$

$A = x^2 - 2x + 6x - 12$

$A = x^2 + 4x - 12$

$A = (x + 6)(x + 8)$

$A = x^2 + 8x + 6x + 48$

$A = x^2 + 14x + 48$

Total Area:

$(x^2 + 4x - 12) + (x^2 + 14x + 48)$

$TA = 2x^2 + 18x + 36$

5.

$TA = 2x^2 + 18x + 36;\ x = 5$

$TA = 2(5)^2 + 18(5) + 36$

$TA = 176$ square feet

6.

$3x^4y^6 \cdot 3^2x^2y^2$

$3^{1+2}x^{4+2}y^{6+2}$

$3^3x^6y^8$

$27x^6y^8$

7.

$5^{8} \cdot \frac{1}{2} x^{3} \cdot \frac{1}{2} y^{11} \cdot \frac{1}{2}$

$5^{4} x^{\frac{3}{2}} y^{\frac{11}{2}}$

8.

$A = lw$; $l = 8y$; $w = 3xy$

$A = (8y)(3xy)$

$A = 24xy^2$ square feet

9.

$x + (x + 1) + (x + 2) = 81$

$3x + 3 = 81$

$3x = 78$

$x = 26$

The three consecutive numbers that add to 81 are 26, 27, 28.

10.

(items made, money)

$y = 0.50x + 60$

$y = 3x$

$3x = 0.50x + 60$

$2.5x = 60$

$x = 24$

Amal needs to sell 24 items to break-even.

11. D

A. $Q = -8$

B. $Q = -3$

C. $Q = 4$

D. $Q = 8$

Distractor Rationale:

A. This is the correct value if the subtraction symbol between the expressions is ignored.

B. This would be the value if $\frac{6x^2}{6Q}$

C. This results in a positive leading coefficient.

$6x^2 - Qx^2 = -2x^2$

$6 - Q = -2$

$-Q = -8$

$Q = 8$

12. C

A. $(11x - 4)^2$

B. $(11x + 4)^2$

C. $(11x - 4)(11x + 4)$

D. $(11x + 8)(11x - 8)$

Distractor Rationale:

A. This product is a trinomial with "+16" as the constant.

B. This product is a trinomial with "+16" as the constant.

C. This product has "−64" as the constant.

$(11x - 4)^2 = (11x - 4)(11x - 4) = 121x^2 - 88x + 16$

$(11x + 4)^2 = (11x + 4)(11x + 4) = 121x^2 + 88x + 16$

$(11x - 4)(11x + 4) = 121x^2 - 16$