Name: _____

Date: _____

The Distributive Property Pattern

AB-TDP 1

Instructions: The Distributive Property pattern shows two equivalent forms of an expression involving a factor multiplied by a group. In these problems, if you are given the grouped form, then use the Distributive Property to re-write the expression without the group. But if you are given the distributed form, then apply the Distributive Property in *reverse* to "factor out" the common factor. See examples:

	grouped form		distributed form
1	$a(b + c)$	=	$ab + ac$
2	$2(x - y)$	=	$2x - 2y$
3	$5(a - b)$	=	
4		=	$ax + ay$
5	$4(a + b - c)$	=	
6	$2(x - y + z)$	=	
7		=	$xa + xb + xc$
8		=	$yx^2 + yx$
9	$-2(a + b + c)$	=	
10		=	$(-3x) + (-3y)$
11	$2(5a + 5b)$	=	
12		=	$5x + 10y$

Name: _____

Date: _____

Applying the Distributive Property - Set 1

Instructions: Apply the Distributive Property to eliminate the group in each expression.

1 $4(2x + 10)$

     $4(2x) + 4(10)$

       $8x + 40$

2 $5(a + 2b)$

3 $-2(x + 1)$

4 $-3(x - 1)$

5 $a(a + b + c)$

6 $x(x^2 - x - 1)$

7 $3(2x + b + 6c)$

8 $-1(5x - 2y + 7z)$

9 $2x(y + 4)$

10 $x^2(x - 1)$

11 $-a(a - 2b)$

12 $3x(4x + 5y)$

▶ The Distributive Property • mathantics.com

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Applying the Distributive Property - Set 2

Instructions: Apply the Distributive Property to eliminate the group in each expression.

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

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

$-25x^2 - 5x + 10$

2 $y(3y + 5)$

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

4 $b(3a - 4b + c)$

5 $9(x + ax + 10)$

6 $4x(x^2 - y^2)$

7 $-x^2(x + y - 1)$

8 $6(2x - 5y + 4z)$

9 $xy(x + y)$

10 $5(-a^3 - 2a^2 + 1)$

11 $4y(2y - x + 10)$

12 $-2(-2x - 3y - 4z)$

▶ **The Distributive Property • mathantics.com**

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Name: _____

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Identifying Common Factors

Instructions: In order to apply the Distributive Property in reverse, you need to be able to identify factors that are common to each term in a polynomial. You can only factor something out if it's a factor of *every* term. For each polynomial, list any factors that all of its terms have in common. (If there are no common factors, write "none")

		common factors
1	$2x^2 + 6x + 4$	2
2	$3a^3 + 3a^2 + 3a$	3a
3	$bx + by - bz$	_____
4	$5a - 10b - 20c$	_____
5	$axy + bxc - yzx$	_____
6	$2xy + 2xa + 2xb$	_____
7	$x^6 + x^4 + x^2$	_____
8	$3a - 6b - 12c$	_____
9	$ay + by + bc$	_____
10	$-2x + (-2y) + (-2z)$	_____
11	$-4x^2 + 8x + 16$	_____
12	$6x^3 + 2x^2 - 4x$	_____

▶ The Distributive Property • mathantics.com

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"Factoring Out" - Set 1

Instructions: Look at each polynomial to identify the common factor(s) in each term. Then, use the Distributive Property in reverse to factor them out.

1 $6x + 24$

$6(x) + 6(4)$

$6(x + 4)$

2 $5a^2 - 10a$

$5a(a) - 5a(2)$

$5a(a - 2)$

3 $2x^2 + 20$

4 $4a - 4b - 4c$

5 $3x^2 + 3y^2 + 3$

6 $9y - 99$

7 $ab + bc$

8 $2xy - 2xz$

9 $(-7)a^2 + (-7)b^2$

10 $5x + 40y + 25$

11 $-xy - 2xz$

12 $3x^3 - 6x^2 - 9x$

▶ **The Distributive Property • mathantics.com**

Name: _____

Date: _____

"Factoring Out" - Set 2

Instructions: Look at each polynomial to identify the common factor(s) in each term. Then, use the Distributive Property in reverse to factor them out.

1 $2x^2 + 2x + 6$

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

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

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

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

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

3 $5x^2 + 5x + 5$

4 $3a - 6b - 9c$

5 $ax + ay^2 + az$

6 $2ax + 2ay + 2az$

7 $4x + 16y$

8 $-5x - 5y$

9 $7a^2 + 7ab$

10 $-2x + (-4y) + (-6z)$

11 $cba + bxa + xyb$

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

The Distributive Property

1 Apply the Distributive Property

$$5(x + 3)$$

2 Apply the Distributive Property

$$-8(a + b - c)$$

3 Apply the Distributive Property

$$x(x + y)$$

4 Apply the Distributive Property

$$a(a^2 + a + 1)$$

5 Apply the Distributive Property

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

6 Apply the Distributive Property

$$2x(3x - 5y)$$

7 Apply the Distributive Property in reverse to factor out a '2' from this polynomial.

$$2a^2 - 2b^2 + 2c^2$$

8 Apply the Distributive Property in reverse to factor out a '2' from this polynomial.

$$8a + 10b + 2c$$

9 Apply the Distributive Property in reverse to factor out an 'x' from this polynomial.

$$7x^3 - 8x^2 - x$$

10 Can you factor anything out of this polynomial? If so, then go for it...

$$6x^2 + 9x$$

Math Antics Worksheets

The Distributive Property Pattern

AB–TDP 1

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	grouped form		distributed form
1	$a(b + c)$	=	$ab + ac$
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3	$5(a - b)$	=	$5a - 5b$
4	$a(x + y)$	=	$ax + ay$
5	$4(a + b - c)$	=	$4a + 4b - 4c$
6	$2(x - y + z)$	=	$2x - 2y + 2z$
7	$x(a + b + c)$	=	$xa + xb + xc$
8	$y(x^2 + x)$	=	$yx^2 + yx$
9	$-2(a + b + c)$	=	$(-2a) + (-2b) + (-2c)$
10	$-3(x + y)$	=	$(-3x) + (-3y)$
11	$2(5a + 5b)$	=	$10a + 10b$
12	$5(x + 2y)$	=	$5x + 10y$

▶ The Distributive Property • mathantics.com

Name: _____

Date: _____

Applying the Distributive Property - Set 1

Instructions: Apply the Distributive Property to eliminate the group in each expression.

1 $4(2x + 10)$

$4(2x) + 4(10)$

$8x + 40$

2 $5(a + 2b)$

$5(a) + 5(2b)$

$5a + 10b$

3 $-2(x + 1)$

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

$-2x - 2$

4 $-3(x - 1)$

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

$-3x + 3$

5 $a(a + b + c)$

$a(a) + a(b) + a(c)$

$a^2 + ab + ac$

6 $x(x^2 - x - 1)$

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

$x^3 - x^2 - x$

7 $3(2x + b + 6c)$

$3(2x) + 3(b) + 3(6c)$

$6x + 3b + 18c$

8 $-1(5x - 2y + 7z)$

$(-1)(5x) + (-1)(-2y) + (-1)(7z)$

$-5x + 2y - 7z$

9 $2x(y + 4)$

$2x(y) + 2x(4)$

$2xy + 8x$

10 $x^2(x - 1)$

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

$x^3 - x^2$

11 $-a(a - 2b)$

$(-a)(a) + (-a)(-2b)$

$-a^2 + 2ab$

12 $3x(4x + 5y)$

$3x(4x) + 3x(5y)$

$12x^2 + 15xy$

▶ The Distributive Property • mathantics.com

Applying the Distributive Property - Set 2

AB-TDP 3

Instructions: Apply the Distributive Property to eliminate the group in each expression.

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

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

$-25x^2 - 5x + 10$

2 $y(3y + 5)$

$y(3y) + y(5)$

$3y^2 + 5y$

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

$(-3)(x^2) + (-3)(-5)$

$-3x^2 + 15$

4 $b(3a - 4b + c)$

$b(3a) + b(-4b) + b(c)$

$3ab - 4b^2 + bc$

5 $9(x + ax + 10)$

$9(x) + 9(ax) + 9(10)$

$9x + 9ax + 90$

6 $4x(x^2 - y^2)$

$4x(x^2) + 4x(-y^2)$

$4x^3 - 4xy^2$

7 $-x^2(x + y - 1)$

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

$-x^3 - x^2y + x^2$

8 $6(2x - 5y + 4z)$

$6(2x) + 6(-5y) + 6(4z)$

$12x - 30y + 24z$

9 $xy(x + y)$

$xy(x) + xy(y)$

$x^2y + xy^2$

10 $5(-a^3 - 2a^2 + 1)$

$5(-a^3) + 5(-2a^2) + 5(1)$

$-5a^3 - 10a^2 + 5$

11 $4y(2y - x + 10)$

$4y(2y) + 4y(-x) + 4y(10)$

$8y^2 - 4xy + 40y$

12 $-2(-2x - 3y - 4z)$

$(-2)(-2x) + (-2)(-3y) + (-2)(-4z)$

$4x + 6y + 8z$

Name: _____

Date: _____

Identifying Common Factors

Instructions: In order to apply the Distributive Property in reverse, you need to be able to identify factors that are common to each term in a polynomial. You can only factor something out if it's a factor of *every* term. For each polynomial, list any factors that all of its terms have in common. (If there are no common factors, write "none")

		common factors
1	$2x^2 + 6x + 4$	2
2	$3a^3 + 3a^2 + 3a$	3a
3	$bx + by - bz$	b
4	$5a - 10b - 20c$	5
5	$axy + bxc - yzx$	x
6	$2xy + 2xa + 2xb$	2x
7	$x^6 + x^4 + x^2$	x^2
8	$3a - 6b - 12c$	3
9	$ay + by + bc$	none
10	$-2x + (-2y) + (-2z)$	-2
11	$-4x^2 + 8x + 16$	4
12	$6x^3 + 2x^2 - 4x$	2x

Name: _____

Date: _____

"Factoring Out" - Set 1

Instructions: Look at each polynomial to identify the common factor(s) in each term. Then, use the Distributive Property in reverse to factor them out.

1 $6x + 24$

$6(x) + 6(4)$

$6(x + 4)$

2 $5a^2 - 10a$

$5a(a) - 5a(2)$

$5a(a - 2)$

3 $2x^2 + 20$

$2(x^2) + 2(10)$

$2(x^2 + 10)$

4 $4a - 4b - 4c$

$4(a) - 4(b) - 4(c)$

$4(a - b - c)$

5 $3x^2 + 3y^2 + 3$

$3(x^2) + 3(y^2) + 3(1)$

$3(x^2 + y^2 + 1)$

6 $9y - 99$

$9(y) - 9(11)$

$9(y - 11)$

7 $ab + bc$

$b(a) + b(c)$

$b(a + c)$

8 $2xy - 2xz$

$2x(y) - 2x(z)$

$2x(y - z)$

9 $(-7)a^2 + (-7)b^2$

$(-7)(a^2) + (-7)(b^2)$

$-7(a^2 + b^2)$

10 $5x + 40y + 25$

$5(x) + 5(8y) + 5(5)$

$5(x + 8y + 5)$

11 $-xy - 2xz$

$(-x)(y) + (-x)(2z)$

$-x(y + 2z)$

12 $3x^3 - 6x^2 - 9x$

$3x(x^2) - 3x(2x) - 3x(3)$

$3x(x^2 - 2x - 3)$

Name: _____

Date: _____

"Factoring Out" - Set 2

Instructions: Look at each polynomial to identify the common factor(s) in each term. Then, use the Distributive Property in reverse to factor them out.

1 $2x^2 + 2x + 6$

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

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

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

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

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

3 $5x^2 + 5x + 5$

$5(x^2) + 5(x) + 5(1)$

$5(x^2 + x + 1)$

4 $3a - 6b - 9c$

$3(a) - 3(2b) - 3(3c)$

$3(a - 2b - 3c)$

5 $ax + ay^2 + az$

$a(x) + a(y^2) + a(z)$

$a(x + y^2 + z)$

6 $2ax + 2ay + 2az$

$2a(x) + 2a(y) + 2a(z)$

$2a(x + y + z)$

7 $4x + 16y$

$4(x) + 4(4y)$

$4(x + 4y)$

8 $-5x - 5y$

$(-5)(x) + (-5)(y)$

$-5(x + y)$

9 $7a^2 + 7ab$

$7a(a) + 7a(b)$

$7a(a + b)$

10 $-2x + (-4y) + (-6z)$

$(-2)(x) + (-2)(2y) + (-2)(3z)$

$-2(x + 2y + 3z)$

11 $cba + bxa + xyb$

$b(ac) + b(ax) + b(xy)$

$b(ac + ax + xy)$

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

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

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

The Distributive Property

1 Apply the Distributive Property

$$5(x + 3)$$

$$5(x) + 5(3)$$

$$5x + 15$$

2 Apply the Distributive Property

$$-8(a + b - c)$$

$$(-8)(a) + (-8)(b) + (-8)(-c)$$

$$-8a - 8b + 8c$$

3 Apply the Distributive Property

$$x(x + y)$$

$$x(x) + x(y)$$

$$x^2 + xy$$

4 Apply the Distributive Property

$$a(a^2 + a + 1)$$

$$a(a^2) + a(a) + a(1)$$

$$a^3 + a^2 + a$$

5 Apply the Distributive Property

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

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

$$12x^2 + 8x - 20$$

6 Apply the Distributive Property

$$2x(3x - 5y)$$

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

$$6x^2 - 10xy$$

7 Apply the Distributive Property in reverse to factor out a '2' from this polynomial.

$$2a^2 - 2b^2 + 2c^2$$

$$2(a^2 - b^2 + c^2)$$

8 Apply the Distributive Property in reverse to factor out a '2' from this polynomial.

$$8a + 10b + 2c$$

$$(2 \times 4)a + (2 \times 5)b + (2)c$$

$$2(4a + 5b + c)$$

9 Apply the Distributive Property in reverse to factor out an 'x' from this polynomial.

$$7x^3 - 8x^2 - x$$

$$x(7x^2 - 8x - 1)$$

10 Can you factor anything out of this polynomial? If so, then go for it...

$$6x^2 + 9x$$

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

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

See Video for step-by-step solutions to each problem.