

Properties of Exponents **DAY 1**

Date_____ Period____

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

2) $m^4 \cdot 2m^{-3}$

3) $4r^{-3} \cdot 2r^2$

4) $4n^4 \cdot 2n^{-3}$

5) $2k^4 \cdot 4k$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

7) $2y^2 \cdot 3x$

8) $4v^3 \cdot vu^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

10) $x^2y^{-4} \cdot x^3y^2$

11) $(x^2)^0$

12) $(2x^2)^{-4}$

13) $(4r^0)^4$

14) $(4a^3)^2$

15) $(3k^4)^4$

16) $(4xy)^{-1}$

$$17) \left(2b^4\right)^{-1}$$

$$18) \left(x^2y^{-1}\right)^2$$

$$19) \left(2x^4y^{-3}\right)^{-1}$$

$$20) \left(3m\right)^{-2}$$

$$21) \frac{r^2}{2r^3}$$

$$22) \frac{x^{-1}}{4x^4}$$

$$23) \frac{3n^4}{3n^3}$$

$$24) \frac{m^4}{2m^4}$$

$$25) \frac{3m^{-4}}{m^3}$$

$$26) \frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$$

$$27) \frac{4x^0y^{-2}z^3}{4x}$$

$$28) \frac{2h^3j^{-3}k^4}{3jk}$$

$$29) \frac{4m^4n^3p^3}{3m^2n^2p^4}$$

$$30) \frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

More Properties of Exponents

DAY 2

Date_____ Period____

Simplify. Your answer should contain only positive exponents.

1) $(x^{-2}x^{-3})^4$

2) $(x^4)^{-3} \cdot 2x^4$

3) $(n^3)^3 \cdot 2n^{-1}$

4) $(2v)^2 \cdot 2v^2$

5) $\frac{2x^2y^4 \cdot 4x^2y^4 \cdot 3x}{3x^{-3}y^2}$

6) $\frac{2y^3 \cdot 3xy^3}{3x^2y^4}$

7) $\frac{x^3y^3 \cdot x^3}{4x^2}$

8) $\frac{3x^2y^2}{2x^{-1} \cdot 4yx^2}$

9) $\frac{x}{(2x^0)^2}$

10) $\frac{2m^{-4}}{(2m^{-4})^3}$

DAY 2

$$11) \frac{(2m^2)^{-1}}{m^2}$$

$$12) \frac{2x^3}{(x^{-1})^3}$$

$$13) (a^{-3}b^{-3})^0$$

$$14) x^4y^3 \cdot (2y^2)^0$$

$$15) ba^4 \cdot (2ba^4)^{-3}$$

$$16) (2x^0y^2)^{-3} \cdot 2yx^3$$

$$17) \frac{2k^3 \cdot k^2}{k^{-3}}$$

$$18) \frac{(x^{-3})^4 x^4}{2x^{-3}}$$

$$19) \frac{(2x)^{-4}}{x^{-1} \cdot x}$$

$$20) \frac{(2x^3z^2)^3}{x^3y^4z^2 \cdot x^{-4}z^3}$$

$$21) \frac{(2pm^{-1}q^0)^{-4} \cdot 2m^{-1}p^3}{2pq^2}$$

$$22) \frac{(2hj^2k^{-2} \cdot h^4j^{-1}k^4)^0}{2h^{-3}j^{-4}k^{-2}}$$

DAY 3

SIMPLIFY EXPRESSIONS

Name: _____

Use the Distributive Principle to do each multiplication problem below.

$$3(\overbrace{2x - 5}) = 6x - 15$$

$$5(6x - 4) =$$

$$(3a + 4b)2 = 6a + 8b$$

$$(x + 5)10 =$$

$$4(\overbrace{3x - y + 5}) = 12x - 4y + 20$$

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

$$6(3x - y + 5) =$$

$$(3x - y + 5)7 =$$

SIMPLIFY EXPRESSIONS

Name: _____

Use the Distributive Principle to do each multiplication problem below.

$$-4(\overbrace{2x - 4}) = -10x + 20$$

$$-4(3y + 5) =$$

$$-3(2a - 5b) =$$

$$(a + x) \cdot 8 =$$

$$-4(\overbrace{3x^2 - 6x + 2}) = -12x^2 + 24x - 8$$

$$-5(3x^2 - 6x + 2) =$$

$$-1(3x^2 - 6x + 2) =$$

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

SIMPLIFY EXPRESSIONS

Name: _____

Write a polynomial for the area of each rectangle.

$$\begin{array}{c} 3x \\ \times \\ 2x+5 \\ \hline \end{array}$$

$$A = 3x(2x + 5)$$

$$= 6x^2 + 15x$$

$$\begin{array}{c} 2x \\ \times \\ 3x \\ \hline \end{array}$$

$$A = 2x(3x)$$

$$= 6x^2$$

$$\begin{array}{c} 3x+4 \\ \times \\ 2x \\ \hline \end{array}$$

$$A = (3x + 4)2x$$

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

$$\begin{array}{c} 2x \\ \times \\ 3x+4 \\ \hline \end{array}$$

$$A = 2x(3x + 4)$$

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

$$\begin{array}{c} 3x \\ \times \\ 6x-1 \\ \hline \end{array}$$

$$A = 3x(6x - 1)$$

$$= 18x^2 - 3x$$

$$\begin{array}{c} 2r+7 \\ \times \\ p \\ \hline \end{array}$$

$$A = (2r + 7)p$$

$$= 2rp + 7p$$

$$\begin{array}{c} 3x \\ \times \\ 6x-1 \\ \hline \end{array}$$

$$A = 3x(6x - 1)$$

$$= 18x^2 - 3x$$

$$\begin{array}{c} 5n \\ \times \\ 7n+4 \\ \hline \end{array}$$

$$A = 5n(7n + 4)$$

$$= 35n^2 + 20n$$

DAY 3

SIMPLIFY EXPRESSIONS

Name: _____
 Multiply each pair of binomials. Remember to multiply each term in the first binomial times each term in the second binomial.

$$(2x - 3)(5x + 4) = |0x^2 + 8x - 15x - 12| \\ = |0x^2 - 7x - 12|$$

$$(3x - 1)(4x + 3) =$$

$$(3x - 4)^2 = (3x - 4)(3x - 4) \\ = 9x^2 - |2x - |2x + 16| \\ = 9x^2 - 24x + 16$$

$$(6x + 1)(2x + 3) =$$

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

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

$$(2x + 5)(x - 3) = \\ (4x - 1)(3x - 1) =$$

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

$$(3x - 5)(2x - 5) = \\ (4x - 3)(x + 3) =$$

$$(3x - 7)^2 = \\ (3x + 6)(x - 1) =$$

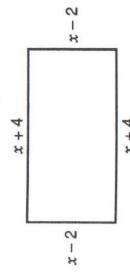
$$(3x + 4)(3x - 4) =$$

SIMPLIFY EXPRESSIONS

Name: _____

Write a polynomial for the area of each rectangle.

$$\begin{array}{c} A = (x - 2)(x + 4) \\ = x^2 + 4x - 2x - 8 \\ = x^2 + 2x - 8 \end{array}$$



$$\begin{array}{c} x+4 \\ \hline x-2 \\ \hline \end{array} \quad \begin{array}{c} x-2 \\ \hline x+4 \\ \hline \end{array}$$

$$\begin{array}{c} x+7 \\ \hline x-4 \\ \hline \end{array} \quad \begin{array}{c} x-4 \\ \hline x+7 \\ \hline \end{array}$$

$$\begin{array}{c} x+2 \\ \hline x-4 \\ \hline \end{array} \quad \begin{array}{c} x-4 \\ \hline x+2 \\ \hline \end{array}$$

$$\begin{array}{c} x+3 \\ \hline x-3 \\ \hline \end{array} \quad \begin{array}{c} x-3 \\ \hline x+3 \\ \hline \end{array}$$

$$\begin{array}{c} x+6 \\ \hline x-1 \\ \hline \end{array} \quad \begin{array}{c} x-1 \\ \hline x+6 \\ \hline \end{array}$$

Date: _____

Name: _____

Multiplying Polynomials**DAY 4****2.** Expand and simplify.

- a)** $(2x + 1)(3x + 7)$ **b)** $(3x - 4)(3x + 5)$
c) $(5x + 3)(x - 2)$ **d)** $(2x - 3)(3x - 2)$

4. Expand and simplify.

- a)** $(2x + 1)^2$ **b)** $(4x - 1)^2$
c) $(3x + 2)^2$ **d)** $(5x - 2)^2$

15. Expand and simplify the expression $(x + 3)(x + 7) - (x + 5)^2$.**5.** A two-lane bridge has width $x + 3$ and length $4x + 5$.

- a)** Sketch a rectangle with these dimensions.
b) Find a quadratic expression that represents the area of the bridge.

DAY 4

James: _____

SIMPLIFY EXPRESSIONS

Name:

SIMPLIFY EXPRESSIONS

In these problems you have to add *and* subtract polynomials. Change the signs on polynomials you are subtracting, but not on ones you are adding.

$$(6x^2 - 4x + 7) + (2x^2 - 3x - 9) =$$

$$(3x^2 + 5x - 1) = (4x^2 - 2x + 1) =$$

$$(3w + 5) \pm (2w - 3) : 6$$

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三、 $\text{BZ} \cdot \text{BC}$ ： $\text{BZ} + \text{BC} = \text{BZ} \cdot \text{BC}$

Solve each equation.

$$8x - (5x - 4) = 25 \quad | +5x \quad | \quad 6x - (4x - 5) = 3 \quad | +4x \quad | \quad 10x = (3x + 5) = 8$$

$$8x + (-5x + 4) = 25$$

$$3x + 4 = 25 - 4$$

$$3x = 21$$

1

$$(6x + 9) - (2x - 5) = 38$$

$$(4x + 10) = (3x + 2) = /4$$

Write a polynomial for the perimeter of each figure.

$$\text{Answer: } P = \frac{10k + 6}{2k - 1}$$

$$\begin{array}{c} 2k-1 \\ \boxed{} \\ 3k+4 \end{array}$$

5m + 7

$$\begin{array}{l} \text{Left side: } x^2 + 3x + 2 \\ \text{Right side: } 2x^2 + x - 3 \\ \hline \text{Difference: } x^2 + 8x + 15 \end{array}$$

DAY 4

Factoring out the GCF **DAY 5****Factor completely.**

1) $8xy + 4xy^2$

2) $9m^3 - 9m^2$

3) $14x^2y^2z + 21xy^2z^2$

4) $20ab^3c^4d - 5ab^2c^2$

5) $12w^3t^2 - 9wt^2 + 15w^2t^3$

6) $-16p^3q^2 + 24p^2q^3 - 32p^4q$

7) $9y^2z^2 - 81y^3z^2 - 90y^2z^4$

8) $36t^5 + 40t^4 - 160t^3 - 20t^2$

9) $8x - x^2$

10) $9y^2 - 3y^3$

11) $2(c - d) + w(c - d)$

12) $x(p + z) + 6(p + z)$

13) $3a(2 + y) + 4b(y + 2)$

14) $bc(m + 10) - 5(10 + m)$

15) $x(y - 3) + n(3 - y)$

16) $2p(q - 8) + 5w(8 - q)$

17) $8xy(d - 12) - 9z(12 - d)$

18) $15a(n - 14) + 28b(14 - n)$

19) $7wx(a - 9) - 10b(9 - a)$

20) $32x(x - y) - 17y(y - x)$

Common Factoring

- 2.** Find the greatest common factor. Then, write the binomial in factored form.

a) $3x + 15$

c) $5x^2 - 10x$

b) $4x^2 + 8x$

d) $-7x^3 + 21x$

- 3.** Factor each polynomial.

a) $3x^2 - 12x + 18$

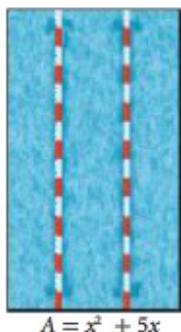
c) $-9x^2 - 3x + 9$

b) $-10x^2 + 20x - 30$

d) $4x^2 - 6x + 8$

- 7.** A swimming pool has the area shown.

- a) Factor completely the expression representing the area to determine the length and the width of the swimming pool.
 b) Find the actual measures of its sides if $x = 2$ m.
 c) Find the perimeter of the pool.



- 8.** Find the dimensions of each rectangle.

a) $A = 21x^2 + 3x$

b) $A = 2x^2 + 18x$

Factoring By Grouping **DAY 6**

Date_____ Period____

Factor each completely.

1) $8r^3 - 64r^2 + r - 8$

2) $12p^3 - 21p^2 + 28p - 49$

3) $12x^3 + 2x^2 - 30x - 5$

4) $6v^3 - 16v^2 + 21v - 56$

5) $63n^3 + 54n^2 - 105n - 90$

6) $21k^3 - 84k^2 + 15k - 60$

7) $25v^3 + 5v^2 + 30v + 6$

8) $105n^3 + 175n^2 - 75n - 125$

9) $96n^3 - 84n^2 + 112n - 98$

10) $28v^3 + 16v^2 - 21v - 12$

11) $4v^3 - 12v^2 - 5v + 15$

12) $49x^3 - 35x^2 + 56x - 40$

13) $24p^3 + 15p^2 - 56p - 35$

14) $24r^3 - 64r^2 - 21r + 56$

$$15) \ 56xw + 49xk^2 - 24yw - 21yk^2$$

$$16) \ 42mc + 36md - 7n^2c - 6n^2d$$

$$17) \ 12x^2u + 3x^2v + 28yu + 7yv$$

$$18) \ 40ac^2 + 25ak^2 + 32bc^2 + 20bk^2$$

$$19) \ 12bc - 4bd - 15xc + 5xd$$

$$20) \ 16mn - 4m^2 + 28n - 7m$$

$$21) \ 56xy - 35x + 16ry - 10r$$

$$22) \ 21xy + 15x + 35ry + 25r$$

$$23) \ 5a^2z - 4a^2c + 15xz - 12xc$$

$$24) \ 4xy + 6 - x - 24y$$

$$25) \ 21xy - 12b^2 + 14xb - 18by$$

$$26) \ 9mz - 4nc + 3mc - 12nz$$

$$27) \ 28xy + 25 + 35x + 20y$$

$$28) \ 30uv + 30u + 36u^2 + 25v$$

Factoring Trinomials ($a > 1$)

DAY 7

Date_____ Period____

Factor each completely.

1) $3p^2 - 2p - 5$

2) $2n^2 + 3n - 9$

3) $3n^2 - 8n + 4$

4) $5n^2 + 19n + 12$

5) $2v^2 + 11v + 5$

6) $2n^2 + 5n + 2$

7) $7a^2 + 53a + 28$

8) $9k^2 + 66k + 21$

9) $15n^2 - 27n - 6$

10) $5x^2 - 18x + 9$

11) $4n^2 - 15n - 25$

12) $4x^2 - 35x + 49$

13) $4n^2 - 17n + 4$

14) $6x^2 + 7x - 49$

15) $6x^2 + 37x + 6$

16) $-6a^2 - 25a - 25$

17) $6n^2 + 5n - 6$

18) $16b^2 + 60b - 100$

DAY 7

Factoring Quadratic Expressions

Factor each completely.

1) $x^2 - 7x - 18$

2) $p^2 - 5p - 14$

3) $m^2 - 9m + 8$

4) $x^2 - 16x + 63$

5) $7x^2 - 31x - 20$

6) $7k^2 + 9k$

7) $7x^2 - 45x - 28$

8) $2b^2 + 17b + 21$

9) $5p^2 - p - 18$

10) $28n^4 + 16n^3 - 80n^2$

11) $3b^3 - 5b^2 + 2b$

12) $7x^2 - 32x - 60$

13) $30n^2b - 87nb + 30b$

14) $9r^2 - 5r - 10$

15) $9p^2r + 73pr + 70r$

16) $9x^2 + 7x - 56$

17) $4x^3 + 43x^2 + 30x$

18) $10m^2 + 89m - 9$

Critical thinking questions:

- 19) For what values of
- b
- is the expression factorable?

$x^2 + bx + 12$

- 20) Name four values of
- b
- which make the expression factorable:

$x^2 - 3x + b$

DAY 8 DECOMPOSITION

PART A:

1. $3x^2 + 14x + 8$

2. $5x^2 + 12x + 4$

3. $6x^2 + 25x - 9$

4. $4x^2 - 13x - 12$

5. $7x^2 - 6x - 16$

6. $3x^2 - 10x - 8$

7. $5x^2 + 32x + 12$

PART B:

1. $2x^2 - 3x - 9$

2. $5x^2 + 39x - 8$

3. $4x^2 + 5x - 9$

4. $3x^2 + 17x + 24$

5. $6x^2 + 11x - 10$

6. $15x^2 + 4x - 3$

7. $2(12 + x^2) + 19x$

8. $7x^2 - 7$

DECOMPOSITION AND

SUM + PRODUCT

1. $5x^2 - 10x - 15$

11. $3x^2 - 4x - 32$

2. $6x^2 - 15x - 21$

12. $4x^2 - 16x + 15$

3. $3x^2 - 10x + 7$

13. $4x^2 + 7x - 15$

4. $2x^2 - 11x - 21$

14. $6a^2 - 21a + 15$

5. $4x^2 + 2x - 20$

15. $11x^2 + 122x + 11$

6. $3x^2 - 5x - 12$

16. $3x^2 - 20x - 7$

7. $7x^2 - 26x - 8$

17. $2y^2 - 17y + 35$

8. $12x^2 - 6x - 18$

18. $4x^2 - 16x + 15$

9. $6x^2 - 13x + 6$

19. $6x^2 + 25x + 25$

10. $2x^2 + 9x + 10$

20. $7c^2 - 16c + 9$

1. $x^2 + 4x - 5$

11. $x^2 - 8x + 15$

2. $x^2 + 15x + 50$

12. $x^2 + x - 72$

3. $x^2 + 4x - 32$

13. $x^2 - 16x + 39$

4. $x^2 + 7x + 6$

14. $x^2 + 22x + 121$

5. $x^2 + 12x + 11$

15. $x^2 + 13x + 12$

6. $x^2 + 12x + 20$

16. $x^2 - 3xy + 2y^2$

7. $x^2 + 2x - 35$

17. $x^2 - 14xy + 24y^2$

8. $x^2 - 18x + 72$

18. $x^2 + 5xy + 6y^2$

9. $x^2 - 15x + 56$

19. $x^2 + 2xy - 63y^2$

10. $x^2 - 6x - 16$

20. $x^2 + 8xy - 33y^2$

Factoring Special Cases

DAY 9

Date_____ Period____

Factor each completely.

1) $16n^2 - 9$

2) $4m^2 - 25$

3) $16b^2 - 40b + 25$

4) $4x^2 - 4x + 1$

5) $9x^2 - 1$

6) $n^2 - 25$

7) $n^4 - 100$

8) $a^4 - 9$

9) $k^4 - 36$

10) $n^4 - 49$

$$11) \ 98n^2 - 200$$

$$12) \ 3 + 6b + 3b^2$$

$$13) \ 400 - 36v^2$$

$$14) \ 100x^2 + 180x + 81$$

$$15) \ 10n^2 + 100n + 250$$

$$16) \ 49n^2 - 56n + 16$$

$$17) \ 49x^2 - 100$$

$$18) \ 1 - r^2$$

$$19) \ 10p^3 - 1960p$$

$$20) \ 343b^2 - 7b^4$$

$$21) \ 81v^4 - 900v^2$$

$$22) \ 200m^4 + 80m^3 + 8m^2$$

Name: _____
Date: _____
Class: _____

DAY 10

IS YOUR SQUARE COMPLETE? WORKSHEET

State whether each trinomial is a perfect square.

1. $x^2 + 8x + 7$

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

2. $x^2 - 8x + 16$

6. $x^2 - 13x + \frac{169}{4}$

3. $x^2 + 4x + 3$

4. $x^2 + 12x + 27$

Find the value of “c” that makes each trinomial a perfect square.

7. $x^2 + 8x + c$

8. $x^2 - 6x + c$

9. $x^2 - 7x + c$

Solve each equation by completing the square.

10. $x^2 + 4x + 3 = 0$

11. $x^2 - 4x = 2$

12. $x^2 + 14x - 10 = 5$

13. $4x^2 - 20x + 25 = 0$

DAY 10

Exercises

Write the following quadratic polynomials in standard form.

1. $x^2 - 10x + 99$
2. $x^2 + 18x - 2$
3. $x^2 - 3x + 5$
4. $-x^2 + 4x + 4$
5. $-x^2 - 12x - 7$
6. $-x^2 + x + 1$
7. $2x^2 + 4x + 6$
8. $3x^2 - 12x - 5$
9. $4x^2 + 5x + 6$
10. $-9x^2 + 18x + 1$
11. $-10x^2 - 40x$
12. $-2x^2 - 3x - 2$
13. $\frac{1}{2}x^2 - x + 1$
14. $-\frac{1}{3}x^2 + 2x - 5$
15. $-\frac{2}{5}x^2 - 6x - 10$