

UNIT 8 : POLYNOMIALS

**12 DAY
UNIT**

Lesson	Skills Covered	
CCSS: A.SSE.2, A.SSE.3, A.APR.3 TEKS: A1.8.A, A1.10.E		
Unit Prep (pgs. 6 – 12)	• Weekly Warm Up Sheet • Exit Tickets • Lesson Plan Template	
(1) Adding and Subtracting Polynomials (pgs. 13 – 22)	• 2 warm Ups • Adding and Subtracting Polynomials Notes (2 – 3 pages) • Adding and Subtracting Polynomials – Practice Worksheet • Adding and Subtracting Polynomials Riddle – Independent Practice • Adding and Subtracting Pairs Game • 2 Exit Tickets	
(2) Multiplying Polynomials (pgs. 23 – 36)	• 3 warm Ups • Multiplying Polynomials Notes (3 pages) • Multiplying Polynomials – Practice Worksheet • Multiplying Polynomials Practice {Coloring Worksheet} • Special Products Notes • Polynomials Quiz (Adding, Subtracting and Multiplying) • 3 Exit Tickets	
(3) Factoring Polynomials (pgs. 37 – 47)	• 2 warm Ups • Factoring $x^2 + bx + c$ Notes (2 pages) • Factoring $x^2 + bx + c$ Riddle – Practice Worksheet • Factoring $ax^2 + bx + c$ Notes (3 pages) • Products, Sums and Factors Practice Worksheet • Factoring Polynomials Practice Worksheet • 2 Exit Tickets	
(4) Polynomial Equations (pgs. 48 – 54)	• 2 Warm-Ups • Polynomial Equations Notes (2 pages) • Polynomial Equations Practice Worksheet • Polynomials Puzzle • 2 Exit Tickets	
End of Unit (pgs. 55 – 58)	• Study Guide • Unit Exam	
Supplemental Resources	• Factoring and Solving Polynomials Stations • Polynomials Review Cube	• Factoring Polynomials Review Game • Polynomials BINGO

12 DAY UNIT

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Name _____
Date _____ Class _____

Warm Up #1

Lesson 1 : Add & Subtract Polynomials

Skill : Distributive Property and Combining Like Terms

- | | |
|--------------------------------|-----------------------------------|
| 1. $4 + 5(x - 2) + 2x$ | 2. $-6b + 5(a + 2b) - 10a$ |
| 3. $13x - 20 + 4(y - 6x) + 3y$ | 4. $9(x - 3y) + 4(2x + 3y) - 10x$ |

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Warm Up #1

Lesson 1 : Add & Subtract Polynomials

Skill : Add and Subtract Polynomials

- | | |
|------------------------------------|--|
| 1. $(2x + 3y - 1) + (4x + 5y + 4)$ | 2. $(4x^2 - 2x - 7) + (3x^2 + 5x + 3)$ |
|------------------------------------|--|

Name _____
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Warm Up #1

Lesson 3 : Factoring Polynomials

Skill : Add, Subtract and Multiply Polynomials

- | | |
|--|---|
| 1. $4x(x + 8) + (2x^2 - 3x + 1)$ | 2. $2(x^2 - x + 4) - (x^2 + x + 7)$ |
| 3. $(2x^2 + 9x + 8) + 3(x^2 - 7x + 2)$ | 4. $9(3x^2 + 4x - 10) - 2(2x^2 + 8x - 7)$ |

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Warm Up #1

Lesson 3 : Factoring Polynomials

Skill : Factoring Polynomials

- | | |
|-------------------------------|-------------------------------|
| 1. Factor $2b^2 + 3b - 20$ | 2. Factor $5y^2 - 30y + 40$ |
| 3. Factor $6x^3 + 54x^2 - 6x$ | 4. Factor $6x^3 + 54x^2 - 6x$ |

Name _____
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Warm Up #1

Lesson 2 : Multiplying Polynomials

Skill : Adding and Subtracting Polynomials

- | | |
|---|--|
| 1. $(-10x^4 + 4x^2 - 7x + 5x^3) + (9x^4 - 6x^2 - 10x)$ | 2. $(-8n^3 + 6n^2 + 3n - 7) - (-8n^3 - 8n^2 - 5n + 7)$ |
| 3. $(-2y^4 + 2y^3 + y^2 - y) - (9y^4 + 3y^2 - 7y + 8y^3)$ | 4. $2(3x^2 + 4x + 3) + 4(5x^2 - 2x + 7)$ |

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Warm Up #2

Lesson 2 : Multiplying Polynomials

Skill : Multiplying Polynomials

- | | |
|------------------------------|--------------------------------|
| 1. $(4 - 5x)(9x + 2x^2 - 6)$ | 2. $(-6x^2 + 3v - 7)(4x + 10)$ |
| 3. $(4 - 5x)(9x + 2x^2 - 6)$ | 4. $(5x + 2)(3x^2 - 7x + 1)$ |

Name _____
Date _____ Class _____

Warm Up #1

Lesson 4 : Polynomial Equations

Skill : Factoring Polynomials

- | | |
|-----------------------|--------------------|
| 1. $x^2 + 4x + 4$ | 2. $x^2 - 9x - 36$ |
| 3. $-12x^2 - 27x - 6$ | 4. $16x^2 - 16$ |

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Warm Up #2

Lesson 4 : Polynomial Equations

Skill : Solving Polynomial Equations

- | | |
|--------------------|----------------------|
| 1. $3x^2 - 9x = 0$ | 2. $12b^2 + 48b = 0$ |
|--------------------|----------------------|

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Warm Ups

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Exit Ticket #1

Lesson 1 : Add & Subtract Polyn

Skill : Adding Polynomials

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

2. $(-8m^2 + m + 8) + (-6m^2 + 4m^3)$

3. $(4y - 2) + (3y - 6)$

4. $(4n + 5) + (-9n^2 + 3n + 5)$

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Exit Ticket #1

Lesson 1 : Add & Subtract Polyn

Skill : Subtracting Polynomials

1. $(-y^4 + 4y^2 - 5y + 5y^3) - (9y + 2y^2 - 6y)$

2. $(-18e^3 - 6e^2 + 3e - 7) - (e^3 - 8e^2 - 5e + 1)$

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Exit Ticket #1

Lesson 3 : Factoring Polynomials

Skill : Factoring Polynomials

1. $n^2 + 4n$

2. $x^2 + 10x + 24$

3. $8x^2 + 26x + 15$

4. $27v^2 - 84v - 96$

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Exit Ticket #1

Lesson 3 : Factoring Polynom

Skill : Factoring Polynomials

1. $18x^2 + 58x + 12$

2. $9b^2 + 9b - 10$

3. $16x^2 - 1$

4. $16x^2 - 1$

Name _____
Date _____ Class _____

Exit Ticket #1

Lesson 2 : Multiplying Polynomials

Skill : Multiplying Polynomials

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

2. $(2x^2 - 6)(4x + 10)$

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

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

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Exit Ticket #2

Lesson 2 : Multiplying Polynomials

Skill : Special Products

1. $(x - 3)^2$

2. $(x + 2)^2$

4. $(x - 10)(x + 10)$

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Exit Ticket #1

Lesson 4 : Polynomial Equations

Skill : Solving Polynomial Equations

1. $x^2 - 5x + 6 = 0$

2. $x^2 + 10x - 24 = 0$

3. $3x^2 - 2x - 5 = 0$

4. $2x^2 + 7x + 6 = 0$

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Lesson 4 : Polynomial Equations

Skill : Solving Polynomial Equations

1. $x^2 - 17x + 72 = 0$

2. $9x^2 - 64 = 0$

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Exit Tickets

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Add & Subtract Polynomials Notes

Key Words

- Monomial - _____
- Degree of a Monomial - _____
- Polynomial - _____
- Degree of a Polynomial - _____
- Leading Coefficient - _____

Add & Subtract Polynomials Notes

Identify and Classify Polynomials

- Determine whether or not an expression is a polynomial.
 - If it is, identify the degree and number of terms.
 - If it isn't, explain why.

	Expression	Polynomial?	Identify the degree and number of terms, or explain why it is not a polynomial.
1	6		
2	$r^{-2} + 7$		
3	$9m^5 - 6n$		
	$6h^4$		
	$+ 4x$		

Name _____
Date _____ Class _____

Multiplying Polynomials Notes

Multiply a Monomial and a Polynomial

Find the product: $4x^2(7x^3 + 3x^2 - 2x + 2)$

Distribute the monomial on the outside of the parentheses to each term inside the parentheses.

$$\begin{array}{l}
 \text{Diagram showing } 4x^2 \text{ distributed to each term in } (7x^3 + 3x^2 - 2x + 2) \\
 4x^2(7x^3) + 4x^2(3x^2) + 4x^2(-2x) + 4x^2(2) \\
 28x^5 + 12x^4 - 8x^3 + 8x^2
 \end{array}$$

Try it.

Find the product: $-2m^2(-4m^3 + 8m^2 + 3m - 10)$

Multiply Polynomials

Find the product: $(4a^2 - 2a + 9)(3a - 2)$

- Distribute each term in the first set of parentheses to the second set of parentheses.

$$\begin{array}{l}
 \text{Diagram showing } (4a^2 - 2a + 9) \text{ distributed to } (3a - 2) \\
 (4a^2)(3a - 2) + (-2a)(3a - 2) + (9)(3a - 2) \\
 12a^3 - 8a^2 - 6a^2 + 4a + 27a - 18 \\
 12a^3 - 14a^2 + 31a - 18
 \end{array}$$

Name _____
Date _____ Class _____

Polynomial Equations Notes

Solving Polynomial Equations:

- Write the original equation.
- Add _____ to both sides of the equation.
- Factor the _____ side of the equation.
- Use the _____ property.
- Solve for x.
- The solutions of the equation are _____.

Solve $x^2 + 9x = -20$

$$x^2 + 9x + 20 = 0$$

$$(x + \underline{\quad})(x + \underline{\quad}) = 0$$

$$x + \underline{\quad} = 0 \quad x + \underline{\quad} = 0$$

$$x = \underline{\quad} \quad x = \underline{\quad}$$

Try it: Solve the equation $x^2 - 7x = -18$.

Solve Multi Step Problems:

Find the dimensions of the rectangle that has a given area of 100in^2 .

- Write an equation using the given information.
- Subtract _____
- Factor _____
- Use the _____ property.
- Solve for x.

$(x - 15)$
inches

x inches

$$x^2 - 15x - 100 = 0$$

$$(x - \underline{\quad})(x + \underline{\quad}) = 0$$

$$x - \underline{\quad} = 0 \quad x + \underline{\quad} = 0$$

$$x = \underline{\quad} \quad x = \underline{\quad}$$

Factoring $x^2 + bx + c$ Notes

Factoring Polynomials - The Basics:

$$x^2 + bx + c = (x + p)(x + q) \text{ if } \underline{\quad} = b \text{ and } \underline{\quad} = c$$

Example:

$$x^2 + 6x + 5 = (x + 5)(x + 1) \text{ because } \underline{\quad} = 6 \text{ and } \underline{\quad} = 5$$

Scenario #1 - Factor when b and c are positive.

Factor $x^2 + 10x + 16$

Factors of 16 whose sum is 10.

and _____ have a sum of _____, so they are the correct values of p

$$x^2 + 10x + 16 = (x + \underline{\quad})(x + \underline{\quad})$$

Simplify

$$x^2 + 10x + 16$$

$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$(x + \underline{\quad})(x + \underline{\quad})$$

When b is negative and c is positive.

Factor $x^2 - 5x + 6$

Since c is positive, p and q must both be _____ because

whose sum is 5.

and _____ have a sum of _____, so they are the correct values of p

$$x^2 - 5x + 6 = (x - \underline{\quad})(x - \underline{\quad})$$

Simplify

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

$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}$$

$$(x - \underline{\quad})(x - \underline{\quad})$$

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Notes

Name _____ Class _____

Add & Subtract Polynomials Practice

Directions: Simplify each expression. Show your work.

1. $(6x^2 - 3x - 1) + (x^2 - 8x + 10)$	2. $(-4x^3 + 3x^2 + x) - (4x^4 - 4x^2 - 3)$	3. $(5x^2 - 2x^3 - 10) +$
4. $(-8x^3 - 4x^2 - 4) + (5x^2 - 8x - 6)$	5. $(-x^3 + 6x^2 - 3) - (5x^2 + 8x^3 - 9)$	6. $(x^4 - 3x^2 + 6) + ($
7. $(-3x - 1) - (8x^2 - 20x + 1)$	8. $(-5x + x^2) + (2x^2 - 2x + 9)$	9. $(6x^3 - 3x + 5x^2) -$

Name _____ Class _____

Multiplying Polynomials Practice

Directions: Simplify each expression. Show your work.

1. $x^2(6x^2 - 3x - 1)$	2. $-4x^3(4x^4 - 4x^2 - 3)$	3. $5x^2(-2x^3 + 3x^2 + 6x - 5)$
4. $(3x + 1)(2x - 16)$	5. $(2y + 4)(y - 8)$	6. $(-x + 12)(2x^2 + 3)$
7. $(x + 4)(2x^2 + 6x - 4)$	8. $(2y + 2)(y^2 - 3y + 7)$	9. $(x^2 + 8x + 1)(x - 3)$
10. $-x(4x + 1)$	11. $x(-2x - 4) + 5x(7 + 2x)$	12. $(x^2 - 6xy + y^2)(2xy)$

Name _____ Class _____

Products, Sums And Factors Practice

Directions: Factor each expression. Show your work and your check.

1. Factor. $-2m^2 + 16m - 24$	2. Factor. $3b^2 - 10b - 8$
Check :	Check :
3. Factor. $-r^2 - 2r + 15$	4. Factor. $5b^2 + 7b - 6$
Check :	Check :
5. Factor. $4x^2 - 12x + 9$	6. Factor. $-6x^2 - 16x - 8$
Check :	Check :

Name _____ Class _____

Polynomial Equations Practice

Directions: Solve each equation. Show your work.

1) $(2y + 3)(y - 9) = 0$	2) $(9w - 2)(7w - 3) = 0$	3) $18x^2 + 12x = 0$
4) $30x^2 = 25x$	5) $x^2 - 13x + 30 = 0$	6) $x^2 - 10x - 600 = 0$
7) $(-3y + 9)(y - 6) = 0$	8) $20x^2 + 18x = 0$	9) $x^2 - 4x - 45 = 0$

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Worksheets

Polynomials

Teachers – Cut the puzzle prior to giving it to students. It is completed com

$16x^2 + 4$  $2x^2 - 8x = 0$	$0, -7$ $(2x + 4)(5x - 2)$ $10x^2 + 16x - 8$	$0, -1$ $0, 2$  $3x^2 - 21x = 0$	$0, -3$ $(2x + 4)(5x^2 + 3x - 2)$ $10x^3 + 26x^2 + 8x - 8$	$0, 3$  $-4x^2 + 4x$
16 $0, 4$  $x - 5$	$3x - 15$  $(2x + 4)$	$0, 1$ $14x - 20$ 		

Name _____
Date _____ Class _____

Add & Subtract Polynomials Riddle

Directions: Solve each problem below. Find the letter associated with the correct answer and place it on the lines at the bottom of the page to answer the riddle.

- | | |
|--|-----------------------------|
| 1. $(5p^2 - 3) + (2p^2 - 5p^3)$ | E. $6p^3 - 6p^2 + 1$ |
| 2. $(6p - 5p^2) + (4p^3 - 3p^2 + 10)$ | P. $10p^2 + 11p - 3$ |
| 3. $(7p^3 + 4p - 12) + (5p^3 + 2p^2 - 5p)$ | T. $-4p^3 - 2p^2 - 6p - 10$ |
| 4. $(5p^2 - 3) - (2p^2 - 5p^3)$ | O. $-5p^3 + 7p^2 - 3$ |
| 5. $(-5p^2 - 8p^3) + (-2p^2 - 5p^3)$ | A. $-10p^3 - 4p^2 + 2p + 5$ |
| 6. $(8p^2 - 3 + 4p) - (-2p^2 - 7p)$ | X. $2p^3 - 2p^2 + 9p - 12$ |
| 7. $4p^3 - 3p^2 + 10)$ | E. $-4p^3 + 8p^2 + 6p - 10$ |
| 8. $(6p^3 - 3p + 8)$ | E. $4p^3 - 8p^2 + 6p + 10$ |
| 9. $(-5p^3 + 2p^2 - 5p)$ | P. $-7p^3 + 9p^2$ |
| 10. $4) + (5p^3 + 2p^2 - 5p - 14)$ | L. $12p^3 + 2p^2 - p - 12$ |

Name _____
Date _____ Class _____

Multiplying Polynomials Practice

Directions: Simplify each expression completely. Find the answer and use the color next to the answer to color in the next page.

- | | |
|----|----------------------------|
| 1. | $(5x^2 - 3)(2x - 5)$ |
| 2. | $(6x - 5)(4x - 3x^2 + 10)$ |
| 3. | $(-4x - 12)(2x^2 - 5x)$ |
| 4. | $(5x - 3)(x^2 - 5)$ |

BLUE

$$-35x^3 - 6x^2 + 68$$

RED

$$-18x^3 + 45x^2 + 7$$

GREEN

$$5x^3 - 3x^2 - 25x$$

YELLOW

$$10x^3 - 25x^2 - 6$$

Name _____
Date _____ Class _____

Factoring $x^2 + bx + c$ Riddle

Directions: Factor each polynomial. Find the letter associated with the correct answer and place it on the lines at the bottom of the page to answer the riddle.

- | | |
|--------------------|---------------------|
| 1. $x^2 + 4x - 21$ | S. $(x + 4)(x - 2)$ |
| 2. $x^2 + 3x - 4$ | W. $(x + 10)^2$ |
| 3. $x^2 - 49$ | T. $(x + 4)(x + 5)$ |
| 4. $x^2 + 8x + 7$ | M. $(x + 7)(x - 3)$ |
| 5. $x^2 - 64$ | N. $(x + 7)(x + 1)$ |

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

7. $x^2 + 9x + 20$

8. $x^2 + 20x + 100$

9. $x^2 - 3y$

10.

Name _____

Date _____ Class _____

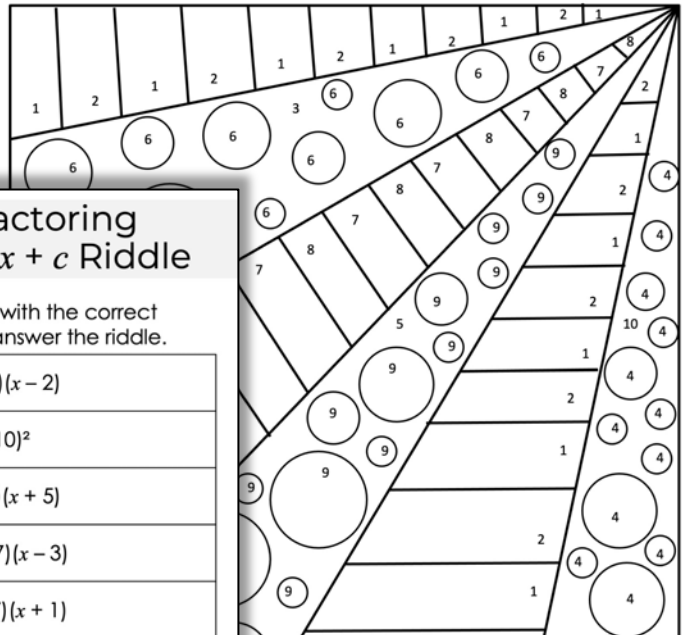
Polynomials Review Cube

OBJECTIVE:

You will create a polynomial review cube to help your classmates review various problems involving polynomials.

STEPS:

1. Write six original (your own) polynomial problems.
 1. Include each of the following: adding polynomials, subtracting polynomials, multiplying polynomials, special products, factoring $x^2 + bx + c$ and factoring $ax^2 + bx + c$.
2. Use the bottom half of this page as a plan sheet. Write out your problems and include solutions.
3. Once you have completed your planning, turn in your problems to be checked for accuracy.



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Activities

What you get with

8. When everyone has finished the cube, you will be given someone else's. On the Cube Solution Sheet, roll the cube four times and solve the four problems you land on. If you roll on a problem you've already solved, roll again!

POLYNOMIALS UNIT

1. Write the polynomial in standard form. $2 + 7x^2 - 4x$	2. Classify the polynomial by the number of terms. $x^3 + 9$
3. Find the sum. $(4x^2 - 2x + 3) + (6x^2 + 5x - 1)$	4. Find the difference. $(9x^2 + 8x - 7) - (3x^2 - 4x + 1)$
5. Multiply. $4c(3c - 8)$	6. Multiply. $(2x - 3)(x + 4)$
7. Multiply. $(x - 7)(2x^2 - 3x + 5)$	8. Multiply. $(x^2 - 2)(x^2 + 3x - 4)$
9. Factor. $18x - 27$	10. Factor. $x^2 + 5x + 6$

Polynomials Unit Exam

Directions: Show work below or on your own paper. Please put a box around your answers.

For # 1 – 4, find the sum or difference.

1) $(6m^3 - 7) + (9m^2 - 4m^3 - 12)$

2) $(-4a^2 + 14a^3 + 6) - (7a^3 - 2a^2 + 9)$

3) $(8y^2 - 5y + 9) - (-6y^2 + 3y + 6)$

4) Find the perimeter.
 $3x + 2y + 4z$

For # 5 – 8, find the product.

5) $(x - 7)^2$

6) $(-6n + 8)(n - 2)$

7) $(7g - 5)(7g + 5)$

8) $(9 + p)(9 - p)$

For # 9 – 10, solve the equation.

9) $(-4y + 8)(y - 8) = 0$

10) $(7w + 5)(-w - 3) = 0$

For # 11

1) $6a^2$

2) $7m^3n^2 + 18mn$

Polynomials Quiz

Directions: Simplify each polynomial. Show your work.

1. $(6 - 4x) - (1 + 3x)$

2. $(2b - 2b^4) + (7b^4 + 6b)$

3. $(-7x - 6x^4 + 5) - (-4x^4 + 5x^3 + 9x)$

4. $(9 + 2x^2 + 10x) + (3x + 5 - 4x^2)$

5. $(7r + 7)(r + 6)$

6. $(x - 5)(8x - 8)$

7. $(3x - 5)(8x^2 - 3x - 5)$

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

10. $(2p + 6)(2p - 6)$

Polynomials Unit Exam

For # 13 – 14, factor and solve.

13) $18x^2 + 12x = 0$

14) $30r^2 = -25r$

For # 15 – 16, factor the trinomial.

15) $a^2 + 26a + 169$

16) $x^2 - 2x - 15$

For # 17 – 18, factor and solve.

17) $x^2 - 14x + 45 = 0$

18) $x^2 - x - 56 = 0$

For # 19 – 22, factor the trinomial.

19) $3r^2 + 12r - 15$

20) $-10m^2 + 34m - 12$

21) $25y^2 + 40y + 16$

22) $225x^2 - 100$

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SIMPLIFYING AND FACTORING POLYNOMIALS

Curriculum Unit 8

UNIT 8

Simplifying & Factoring POLYNOMIALS

UNIT 8

Polynomial Sampling & Factorizing

UNIT 8

Simplifying & Factoring POLYNOMIAL

UNIT 8

Simplifying & Factoring POLYNOMIAL

Unit EIGHT

Pre and Post Assessments

Pre-Algebra Curriculum

STUDENT TRACKING

Name	Pre Assessment	Post Assessment	Notes

Unit EIGHT Lesson ONE

Adding & Subtracting Polynomials

Pre-Algebra Curriculum

STUDENT TRACKING

Name	Warm Up 1	Warm Up 2	Notes	Practice	Riddle

Unit EIGHT Lesson THREE

Factoring Polynomials

Pre-Algebra Curriculum

STUDENT TRACKING

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Tracking Sheets & Binder Labels