

Factoring

Summary	
<p>In this lesson, students sort polynomial expressions into categories based on the type of factoring they require. Then they work together in groups to create a factoring chapter or book explaining how to factor each type of polynomial.</p>	
Utah State Core Standard	
<p>This topic is not included in the state core, although it is an important prerequisite skill for future mathematics classes.</p>	
Desired Results	
Benchmark/Enduring Understanding	
Essential Questions	Skills
<p>What are the different ways to factor a polynomial? How can we tell when a polynomial can't be factored?</p>	<ul style="list-style-type: none"> • Factoring trinomials in the form: $Ax^2 + bx + c$ • Factoring special products: perfect square trinomial, difference of squares, and sum and difference of cubes. • Recognizing polynomials that can't be factored.
Assessment Evidence	
<p>The written portion of this lesson is an assessment of student understanding of factoring and includes a scoring guide for students and teachers.</p>	

Instructional Activities
<p>Launch: The lesson begins with a sorting activity. Some teachers chose to have students start the factoring unit by sorting the polynomials and then revisiting the sorting activity at the end of the unit before asking students to write about factoring.</p> <p>Explore: Students work in groups to create their factoring presentation. Some teachers asked students to create Powerpoint presentations, rather than using paper and pencil. Each student is responsible for creating a section, with the group doing the final review.</p> <p>Summarize: Students can share their work with other groups to compare how they sorted the polynomials and explained the factored. It is often useful to have a peer</p>

review of the writing assignment before it is turned in to the teacher, so that students have a chance to improve the quality of the work before it is graded.

Materials Needed

Copies of assignment

Computers with Powerpoint (optional)

LAUNCH: Work with your group to cut out, then sort these expressions into categories based on how they would be factored.

$x^2 - 9$	$x^2 + 9$	$3a^2 + 24a + 25$
$3x^2 - 9x$	$x^2 + 6x - 27$	$x^3 - 27$
$x^2 - 6x + 9$	$8x^3 + 1$	$x^2 + 2x - xy - 2y$
$x^2 + 4x + 4$	$x^2 + 6x + 8$	$2x^2 + 3x + 1$

$x^2 - 16$	$m^2x^2 + mx + 5$	$5x^2 + 6x - 8$
$4x^2 + 8x - 24$	$y^2 - 12y + 20$	$27x^3 - 8$
$x^2 - 8x + 16$	$x^3 + 1$	$x^3 + 4x^2 + 4x + 16$
$x^2 + 10x + 25$	$x^2 - 5x + 6$	$2x^2 + 7x + 3$

$81y^2 - 49x^2$	$x^2 + y^2$	$5x^2 + 10x - 15$
$10a^3b - 12a^2b^2$	$x^2 + 6xy - 27y^2$	$27x^3 - 8$
$4x^2 - 12xy + 9y^2$	$y^4 - 1$	$8ax - 6x - 12a + 9$
$4x^2 + 20x + 25$	$x^2 - 5x - 6$	$12x^2 - 8xy - 15y^2$

GROUP:

Your group has been hired to rewrite the factoring unit of your textbook. As a group, you need to:

1. Write an introduction that explains what it means to factor a polynomial
2. Organize the factoring unit to include all the ways of factoring. (You may want to use the categories you found in the sorting activity.)
3. Assign each member of the group an equal portion of the unit to write. Each individual's work is going to be compiled to make the entire factoring unit that the group will submit together.
4. Determine how the sections are to be compiled and presented as one unit.

Your group grade is based on:

1. The quality of the introduction that your group writes together.
2. The organization of the unit that your group submits.
3. How completely you have covered all aspects of factoring.
4. The overall quality of the presentation.

INDIVIDUAL:

Each group member's section of the unit is required to have the following elements:

1. Title – the name of your type of factorization
2. Explanation with examples – Explain to the reader how to identify your type of factoring problem and all of the details on how to factor it. Make it as simple and easy to follow as possible.

Your individual grade is based on the overall quality of the section that you write. The following elements are evaluated:

1. Word choice:
 - Vocabulary is used correctly.
 - The words engage the reader.
 - The explanation is clear and understandable.
 - The explanation has enough detail to make your point, but not so complicated that it confuses the reader.
2. Presentation:
 - Examples should be visually appealing. You may want to use illustrations, diagrams, arrows or other symbols to aid your explanation.
 - Illustrations should support the explanation and not distract the reader.
 - The presentation should be neat.
 - The explanations should be organized logically.