



Name: _____

Date: _____

Student Exploration: Factoring Special Products

Vocabulary: difference of two squares, factor, greatest common factor, monomial, perfect-square trinomial, polynomial

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Find each product below.

A. $(x + 3)(x + 5) =$ _____

B. $(x + 5)(x + 5) =$ _____

C. $(x + 5)(x - 5) =$ _____

2. When do the two middle terms add to zero? _____

Gizmo Overview

A **polynomial** is an expression consisting of one or more **monomials** (or terms) added to or subtracted from each other. In the *Factoring Special Products* Gizmo, you will **factor** given polynomials, if possible, which means to express them as a product.

Here's how the Gizmo looks at first:

The polynomial for you to factor is here.

The tiles give you four choices for the next step. Choose the one you think is correct and drag it into the white area above.

Solution steps: (drag the next solution step into the window above)

| | |
|---------------|-------------------|
| Factor out 8 | Factor out 5 |
| Factor out 10 | Can't be factored |

Undo New

Click **Undo** to undo your last choice.

Click **New** to go to a different problem.

Read your feedback in the Gizmo. (No feedback is given for correct answers.)


! Squaring a difference will always give a negative middle term. Try again.

Proceed

Click **Proceed** to go to the next step.

Continue until the polynomial is factored. Then click **New** for a new problem to work on.



| | | |
|--|--|---|
| Activity: Factoring polynomials | <u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> You should see the expression $5x^2 + 80x + 320$. If not, click Refresh in your browser. |  |
|--|--|---|

1. You should see the polynomial shown to the right at the top of the Gizmo.

$$5x^2 + 80x + 320$$

Factor the special product.

- A. The **greatest common factor** (GCF) is the largest factor that divides evenly into a number or polynomial.

Does this polynomial have a GCF greater than 1? _____ If so what is it? _____

- B. In the Gizmo, choose the correct first step. If your choice is incorrect, read the given feedback and try again. What factored expression do you get? _____

- C. Now factor $x^2 + 16x + 64$. _____

- D. In the Gizmo, choose the next correct step. What is the answer? _____

- E. Why do you think the trinomial $x^2 + 16x + 64$ is called a **perfect-square trinomial**?

- F. Given how $5x^2 + 80x + 320$ factors, how do you think $5x^2 + 80xy + 320y^2$ factors?

$$5x^2 + 80xy + 320y^2 = \underline{\hspace{10em}}$$

2. Click **New**. You should now see the polynomial shown to the right in the Gizmo.

$$z^2 - 36$$

Factor the special product.

- A. Why do you think $z^2 - 36$ is called a **difference of two squares**? _____

- B. In the Gizmo, choose the correct factorization. What is the answer? _____

- C. Do you think the polynomial $z^2 + 36$ can be factored? _____ Why or why not?

3. Click **New**. Work through more problems in the Gizmo. Be sure to read the feedback in the Gizmo along the way.

(Activity continued on next page)



Activity (continued from previous page)

4. Factor each polynomial, if possible. If the polynomial cannot be factored, write "Can't be factored." If it can, write all your steps in the space below each problem.

A. $x^2 - 100$

E. $12z^2 - 60z + 75$

B. $m^2 + 14m + 49$

F. $2x^2 + 18y^2$

C. $6y^2 - 24$

G. $9r^4 - s^4$

D. $c^2 + 8c - 16$

H. $x^2 + 12xy + 36y^2$

