



## 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? \_\_\_\_\_

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

$5x^2 + 80xy + 320y^2 =$  \_\_\_\_\_



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

