

Lesson 9: Mastering Factoring

Classwork

Opening Exercise

1. A. Factor each of the following expressions.

a. $x^2 - 1$

b. $9x^2 - 1$

c. $x^2 + 8x + 15$

d. $4x^2 + 16x + 15$

e. $x^2 - y^2$

f. $x^4 - y^4$

B. What similarities do you notice between the examples in the left column and those on the right?

2. Consider the polynomial expression $y^4 + 4y^2 + 16$.
- A. Is $y^4 + 4y^2 + 16$ factorable using the methods we have seen so far?
- B. Factor $y^6 - 64$ first as a difference of cubes, and then factor completely: $y^6 - 64 = (y^2)^3 - 4^3$.
- C. Factor $y^6 - 64$ first as a difference of squares, and then factor completely: $y^6 - 64 = (y^3)^2 - 8^2$.
- D. Explain how your answers to parts (B) and (C) provide a factorization of $y^4 + 4y^2 + 16$.
- E. If a polynomial can be factored as either a difference of squares or a difference of cubes, which formula should you apply first, and why?

Homework Problem Set

1. Write $9 - 16x^4$ as the product of two factors.

2. Factor $4x^2y^4 - 25x^4z^6$.

3. Factor the following expressions:

A. $4x^2 + 4x - 63$

B. $12y^2 - 24y - 15$

C. $x^3 - 64$

D. $2x^3 + 128$

4. If possible, factor the following expressions using the techniques discussed in this unit.

a. $25x^2 - 25x - 14$	b. $9x^2 - 25y^4z^6$
c. $9x^2y^2 - 18xy + 8$	d. $36x^6y^4z^2 - 25x^2z^{10}$
e. $45y^2 + 15y - 10$	f. $4x^2 + 9$
g. $y^6 - y^3 - 6$	h. $x^4 - 36$
i. $x^3 - 125$	j. $1 + 27x^9$
k. $2x^4 - 16x$	l. $x^3y^6 + 8z^3$