Factoring Polynomials: Proficiency Exam*

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Abstract

This module is from Elementary Algebra by Denny Burzynski and Wade Ellis, Jr. Factoring is an essential skill for success in algebra and higher level mathematics courses. Therefore, we have taken great care in developing the student's understanding of the factorization process. The technique is consistently illustrated by displaying an empty set of parentheses and describing the thought process used to discover the terms that are to be placed inside the parentheses. The factoring scheme for special products is presented with both verbal and symbolic descriptions, since not all students can interpret symbolic descriptions alone. Two techniques, the standard "trial and error" method, and the "collect and discard" method (a method similar to the "ac" method), are presented for factoring trinomials with leading coefficients different from 1. This module contains a proficiency exam for the chapter "Factoring Polynomials".

1 Proficiency Exam

Exercise 1 *(Solution on p. 3.)*

(here[1]) The product is $27a^3 + 9a^2 + 9a$ and a factor is $3a$. Find the other factor.

Exercise 2 *(Solution on p. 3.)*

(here[2]) The product is $15x^{n+5}y^{3n-2}$. Find the other factor.

For the following problems, factor, if possible, the polynomials.

Exercise 3 *(Solution on p. 3.)*

(here[3]) $-14x^2y^4b - 28x^2y^3b - 42x^2y^2$

Exercise 4 *(Solution on p. 3.)*

(here[4]) $(y+2)\,a + (y+2)\,c$

Exercise 5 *(Solution on p. 3.)*

(here[5]) $6x^2y^2z + 5x^2 \qquad y^3 \qquad -12xyz - 10xy^2$

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[1] "Factoring Polynomials: Finding the factors of a Monomial" <http://cnx.org/content/m18870/latest/>

[2] "Factoring Polynomials: Finding the factors of a Monomial" <http://cnx.org/content/m18870/latest/>

[3] "Factoring Polynomials: The Greatest Common Factor" <http://cnx.org/content/m21913/latest/>

[4] "Factoring Polynomials: The Greatest Common Factor" <http://cnx.org/content/m21913/latest/>

[5] "Factoring Polynomials: Factoring by Grouping" <http://cnx.org/content/m21901/latest/>

Exercise 6 *(Solution on p. 3.)*

(**here**[6]) $4a^2 - 16c^2$

Exercise 7 *(Solution on p. 3.)*

(**here**[7]) $m^4 - n^4$

Exercise 8 *(Solution on p. 3.)*

(**here**[8]) $b^2 + 8b + 16$

Exercise 9 *(Solution on p. 3.)*

(**here**[9]) $9y^2 - 30y + 25$

Exercise 10 *(Solution on p. 3.)*

(**here**[10]) $x^2 + 5x - 15$

Exercise 11 *(Solution on p. 3.)*

(**here**[11]) $x^2 - x - 30$

Exercise 12 *(Solution on p. 3.)*

(**here**[12]) $4x^6 - 36x^4 + 80x^2$

Exercise 13 *(Solution on p. 3.)*

(**here**[13]) $9x^2 + 25x - 6$

[6] "Factoring Polynomials: Factoring Two Special Products" <http://cnx.org/content/m21903/latest/>
[7] "Factoring Polynomials: Factoring Two Special Products" <http://cnx.org/content/m21903/latest/>
[8] "Factoring Polynomials: Factoring Two Special Products" <http://cnx.org/content/m21903/latest/>
[9] "Factoring Polynomials: Factoring Two Special Products" <http://cnx.org/content/m21903/latest/>
[10] "Factoring Polynomials: Factoring Trinomials with Leading Coefficient 1" <http://cnx.org/content/m21904/latest/>
[11] "Factoring Polynomials: Factoring Trinomials with Leading Coefficient 1" <http://cnx.org/content/m21904/latest/>
[12] "Factoring Polynomials: Factoring Trinomials with Leading Coefficient Other Than 1" <http://cnx.org/content/m21912/latest/>
[13] "Factoring Polynomials: Factoring Trinomials with Leading Coefficient Other Than 1" <http://cnx.org/content/m21912/latest/>

Solutions to Exercises in this Module

Solution to Exercise (p. 1)
$9a^2 + 3a + 3$
Solution to Exercise (p. 1)
$5x^n y^{2n-3}$
Solution to Exercise (p. 1)
$-14x^2y^2\left(y^2b + 2yb + 3\right)$
Solution to Exercise (p. 1)
$(a + c)(y + 2)$
Solution to Exercise (p. 1)
$xy(xy - 2)(6z + 5y)$
Solution to Exercise (p. 1)
$4(a + 2c)(a - 2c)$
Solution to Exercise (p. 2)
$\left(m^2 + n^2\right)(m + n)(m - n)$
Solution to Exercise (p. 2)
$(b + 4)^2$
Solution to Exercise (p. 2)
$(3y - 5)^2$
Solution to Exercise (p. 2)
not factorable
Solution to Exercise (p. 2)
$(x - 6)(x + 5)$
Solution to Exercise (p. 2)
$4x^2\left(x^2 - 5\right)(x + 2)(x - 2)$
Solution to Exercise (p. 2)
$(9x - 2)(x + 3)$