Lesson 5.3: Factoring Trinomials

Complete the *Practice* below. When you have completed all the questions for *Lesson 5.3 Practice – III* with your best work, mark your work by first comparing your answers to the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – III

1. Use algebra tiles to factor the following trinomials.

   a. $x^2 - 4x + 3$

   b. $p^2 + 2p - 8$

c. $2r^2 - 7r - 4$

d. $9x^2 - 6x + 1$

2. Identify two integers with the given product and sum.

   a. product = 42, sum = 13

   b. product = 36, sum = –13

   c. product = –9, sum = 0

3. Factor each of the following.

   a. $x^2 + x - 12$

   b. $i^2 - 10i + 25$

   c. $x^2 - 9$ (Hint: This isn't a trinomial, but it can be factored using the same strategy.)

4. Luke factored $x^2 - 9x + 14$ as shown.

   I know –7 and –2 have a sum of –9 and a product of 14, so the factors must be $x - 7$ and $x - 2$.

   Luke showed his work to Destiny, who was working on the same problem. She said that Luke could not be correct because she found different factors for $x^2 - 9x + 14$. Then, she showed Luke her verification.

$$\begin{aligned}(2-x)(7-x) &= (2)(7)+(2)(-x)+(7)(-x)+(-x)(-x)\\ &= 14-2x-7x+x^2\\ &= 14-9x+x^2\\ &= x^2-9x+14\end{aligned}$$

   Explain how this discussion could be resolved.

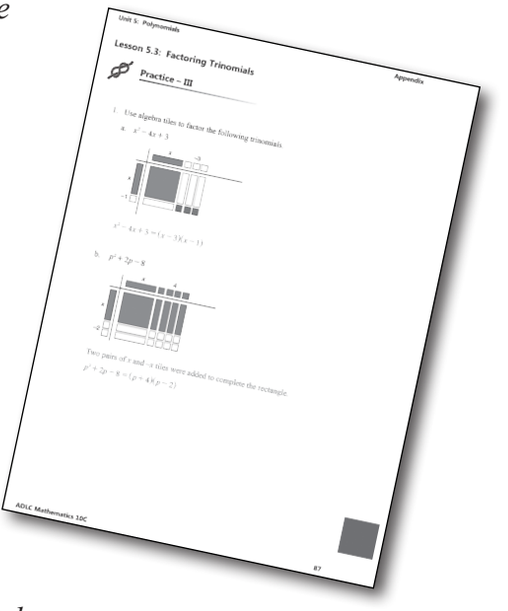
Mark your work for *Lesson 5.3 Practice – III* using the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 5.3 Practice – III* is _____.

Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.

Question Number	Got it!	Almost there…	Need to retry or ask for help.
1			
2			
3			
4			


Unit 5: Polynomials

Lesson 5.3: Factoring Trinomials

Practice – III

Appendix

1. Use algebra tiles to factor the following trinomials.

a. $x^2 - 4x + 3$

$x^2 - 4x + 3 = (x - 3)(x - 1)$

b. $p^2 + 2p - 8$

Two pairs of x and $-x$ tiles were added to complete the rectangle.

$p^2 + 2p - 8 = (p + 4)(p - 2)$

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Please return to *Lesson 5.3* to continue your work in *Unit 5: Polynomials*.

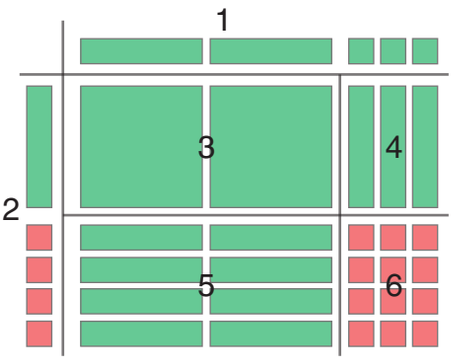
Lesson 5.3: Factoring Trinomials

Complete the *Practice* below. When you have completed all the questions for *Lesson 5.3 Practice – IV* with your best work, mark your work by first comparing your answers to the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – IV

1. In *Lesson 5.3*, when trying to determine a strategy for factoring trinomials of the form $ax^2 + bx + c, a \neq 1$, the binomial factors $(mx + p)$ and $(nx + q)$ were multiplied to give $mnx^2 + (mq + np)x + pq$. Match each expression to the appropriate section of the algebra tile array shown. Explain your choices.

   - mn
   - mq
   - np
   - pq
   - $mx + p$
   - $nx + q$



2. Factor each of the following.

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

   b. $4x^2 - 4x + 1$

   c. $-2a^2 - 7a - 3$

3. Mariah tried to factor $3x^2 + 23x - 36$. Her work is shown.

   The value of *ac* is –108 and the value of *b* is 23. Two numbers that add to give 23 and multiply to give –108 are 27 and –4. This means the factors of $3x^2 + 23x - 36$ are $(x + 27)(x - 4)$.

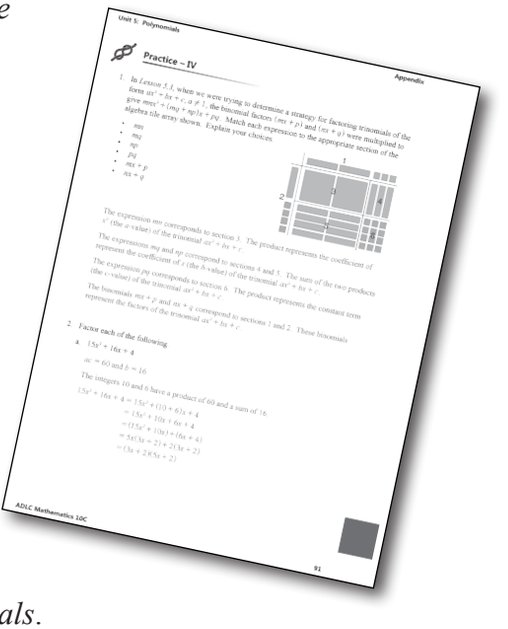
   Comment on Mariah's strategy. If she made an error, make the necessary corrections.

Mark your work for *Lesson 5.3 Practice – IV* using the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 5.3 Practice – IV* is _____.

Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.


Unit 5: Polynomials

Practice – IV

Appendix

1. In *Lesson 5.1*, when we were trying to determine a strategy for factoring trinomials of the form $ax^2 + bx + c$, $a \neq 1$, the binomial factors $(mx + p)$ and $(nx + q)$ were multiplied to give $mnx^2 + (mq + np)x + pq$. Match each expression to the appropriate section of the algebra tile array shown. Explain your choices.

- mn
- mq
- np
- pq
- $mx + p$
- $nx + q$

The expression mn corresponds to section 3. The product represents the coefficient of x^2 (the a-value) of the trinomial $ax^2 + bx + c$.

The expressions mq and np correspond to sections 4 and 5. The sum of the two products represent the coefficient of x (the b-value) of the trinomial $ax^2 + bx + c$.

The expression pq corresponds to section 6. The product represents the constant term (the c-value) of the trinomial $ax^2 + bx + c$.

The binomials $mx + p$ and $nx + q$ correspond to sections 1 and 2. Those binomials represent the factors of the trinomial $ax^2 + bx + c$.

2. Factor each of the following.

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

$ac = 60$ and $b = 16$

The integers 10 and 6 have a product of 60 and a sum of 16.

$15x^2 + 16x + 4 = 15x^2 + (10 + 6)x + 4$

$= 15x^2 + 10x + 6x + 4$

$= (15x^2 + 10x) + (6x + 4)$

$= 5x(3x + 2) + 2(3x + 2)$

$= (3x + 2)(5x + 2)$

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Please return to *Lesson 5.3* to continue your work in *Unit 5: Polynomials*.

Question Number	Got it!	Almost there…	Need to retry or ask for help.
1			
2			
3			

Lesson 5.3: Factoring Trinomials

Complete the *Practice* below. When you have completed all the questions for *Lesson 5.3 Practice – V* with your best work, mark your work by first comparing your answers to the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – V

1. Factor each of the following expressions.

   a. $7x^2 + 21x + 14$

   b. $6r^2 + 12rs + 6s^2$

   c. $4x^2 - 4xy - 8y^2$

d. $-6x^2 + 10xy + 4y^2$

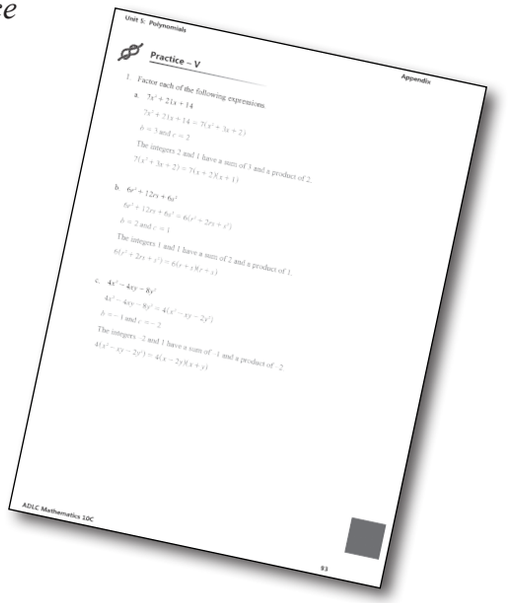
2. Using an example, explain why factoring a GCF out of a trinomial can make factoring the trinomial easier.

Mark your work for *Lesson 5.3 Practice – V* using the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 5.3 Practice – V* is _____.

Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.


Unit 5: Polynomials

Practice – V

Appendix

1. Factor each of the following expressions.

a. $7x^2 + 21x + 14$

$7x^2 + 21x + 14 = 7(x^2 + 3x + 2)$

$b = 3$ and $c = 2$

The integers 2 and 1 have a sum of 3 and a product of 2.

$7(x^2 + 3x + 2) = 7(x + 2)(x + 1)$

b. $6r^2 + 12rs + 6s^2$

$6r^2 + 12rs + 6s^2 = 6(r^2 + 2rs + s^2)$

$b = 2$ and $c = 1$

The integers 1 and 1 have a sum of 2 and a product of 1.

$6(r^2 + 2rs + s^2) = 6(r + s)(r + s)$

c. $4x^2 - 4xy - 8y^2$

$4x^2 - 4xy - 8y^2 = 4(x^2 - xy - 2y^2)$

$b = -1$ and $c = -2$

The integers -2 and 1 have a sum of -1 and a product of -2.

$4(x^2 - xy - 2y^2) = 4(x - 2y)(x + y)$

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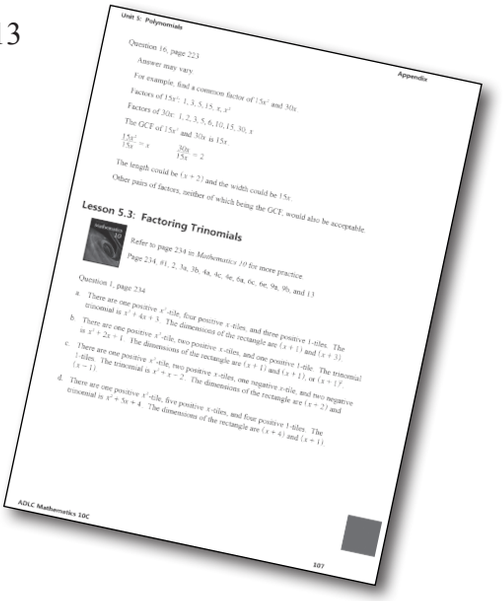
Question Number	Got it!	Almost there…	Need to retry or ask for help.
1			
2			

You may proceed to *Explore Your Understanding Assignment* on the next page of this *Workbook*.

Note: Before you complete *Explore Your Understanding*, you may review your skills and get more practice by completing the following problems in *Mathematics 10*.

- Page 234, #1, 2, 3a, 3b, 4a, 4c, 4e, 6a, 6c, 6e, 9a, 9b, and 13

Check your work in *Enhance Your Understanding*.


Unit 5: Polynomials

Question 16, page 223

Answer may vary.

For example, find a common factor of $15x^2$ and $30x$.

Factors of $15x^2$: 1, 3, 5, 15, x, x^2

Factors of $30x$: 1, 2, 3, 5, 6, 10, 15, 30, x

The GCF of $15x^2$ and $30x$ is $15x$.

$\frac{15x^2}{15x} = x$ $\quad$ $\frac{30x}{15x} = 2$

The length could be $(x + 2)$ and the width could be $15x$.

Other pairs of factors, neither of which being the GCF, would also be acceptable.

Appendix

Lesson 5.3: Factoring Trinomials

Refer to page 234 in *Mathematics 10* for more practice.

Page 234, #1, 2, 3a, 3b, 4a, 4c, 4e, 6a, 6c, 6e, 9a, 9b, and 13

Question 1, page 234

a. There are one positive x^2-tile, four positive x-tiles, and three positive 1-tiles. The trinomial is $x^2 + 4x + 3$. The dimensions of the rectangle are $(x + 1)$ and $(x + 3)$.

b. There are one positive x^2-tile, two positive x-tiles, and one positive 1-tile. The trinomial is $x^2 + 2x + 1$. The dimensions of the rectangle are $(x + 1)$ and $(x + 1)$, or $(x + 1)^2$.

c. There are one positive x^2-tile, two positive x-tiles, and one negative 1-tile. The trinomial is $x^2 + x - 2$. The dimensions of the rectangle are $(x + 2)$ and $(x - 1)$.

d. There are one positive x^2-tile, five positive x-tiles, and four positive 1-tiles. The trinomial is $x^2 + 5x + 4$. The dimensions of the rectangle are $(x + 4)$ and $(x + 1)$.

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