

# Tips for Teachers

## Chapter 11 Algebra: Solving Equations and Problems

### Section 11.1 Introduction to Algebra: Factoring

Factoring is a critical skill in algebra and, hence, is one that your students must master in order to be successful when they study algebra. Students encounter two common pitfalls when they learn to factor.

#### Factoring Completely

One pitfall is failing to factor out the *largest* factor common to all the terms of an expression. To help avoid this you could present an example in the following way.

Factor:  $8x - 16y + 24$ .

Observe that 4 is a common factor, and factor it out.

$$\begin{aligned} 8x - 16y + 24 &= 4 \cdot 2x - 4 \cdot 4y + 4 \cdot 6 \\ &= 4(2x - 4y + 6) \end{aligned}$$

Then observe that although we have factored  $8x - 16y + 24$ , we have not factored out the largest common factor, because the terms in the expression inside the parentheses have a common factor of 2. Proceed:

$$\begin{aligned} 8x - 16y + 24 &= 4 \cdot 2x - 4 \cdot 4y + 4 \cdot 6 \\ &= 4(2x - 4y + 6) \\ &= 4(2 \cdot x - 2 \cdot 2y + 2 \cdot 3) \\ &= 4 \cdot 2(x - 2y + 3) \\ &= 8(x - 2y + 3) \end{aligned}$$

Now examine the expression inside the parentheses again. Since there is no factor common to  $x$ ,  $2y$ , and 3, we have now factored out the largest common factor. Repeat the example, factoring out 8 in one step this time.

$$\begin{aligned} 8x - 16y + 24 &= 8 \cdot x - 8 \cdot 2y + 8 \cdot 3 \\ &= 8(x - 2y + 3) \end{aligned}$$

Explain to your students that, after factoring out a common factor, they should always examine the expression left inside parentheses and determine whether a common factor remains. They have not given the result in the desired form until the *largest* common factor has been factored out.




#### When a Factor of 1 Remains

The second pitfall occurs when a factor of 1 remains in a term after the largest common factor is factored out. When factoring  $6x - 9y + 3$ , for instance, some students will write  $3(2x - 3y)$  rather than  $3(2x - 3y + 1)$ . By writing an intermediate step ( $3 \cdot 2x - 3 \cdot 3y + 3 \cdot 1$  in this case) you can help emphasize that a term of 1 must be included in the parentheses.

#### Checking Factorizations

Also encourage your students to check factorizations by multiplying. Make it a practice to do this yourself in class in order to foster the same habit in your students.

Supplement Key  
Further Instruction and Practice for Your Students





Video	Audio cassette	InterAct Math Online Exercises	Printed Test Bank/Instructor's Resource Guide	
 Tape 19	 17A		Exercises p. 652	Chapter Review p. 760

## Section 11.5 Solving Applied Problems

### The Five-Step Problem-Solving Process

Although the five steps for problem-solving were introduced in Section 1.8 of the text, some students might have neglected to use them, perhaps because the problems being solved earlier were largely computational in nature. The problems in this section are more algebraic than those seen earlier. Hence, it is now more critical than ever that students have a structured approach to problem-solving. See Tips for Teachers for Section 1.8 for hints on teaching problem-solving.

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Video	Audio cassette	MathMax CD-ROM	InterAct Math Online Exercises	Printed Test Bank/Instructor's Resource Guide	
 Tape 20	 18A	 Section 11.5		Exercises pp. 655-656	Chapter Review p. 760