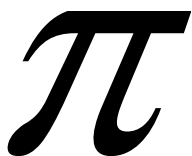
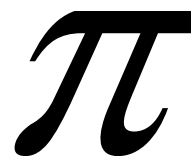


## Section 5.6 A General Factoring Strategy

### ***As Easy as Pi !***



The number pi, symbolized as  $\pi$ , is a special number that denotes the ratio of a circle's circumference to its diameter. Pi is necessary when calculating the area of a circle.



In the Exercise Set for this section of the textbook, we will use  $\pi$ , and factoring, to write an expression that represents the area of a circular ring.

#### First Steps:

- Take comprehensive notes** from your instructor's lecture and insert your notes into this section of the *Learning Guide*. Be sure to write down all examples, definitions, and other key concepts. Additional learning resources include the *Lecture Series on DVD*, the *PowerPoints*, and Section 5.6 of your textbook which begins on page 374.
- Complete the *Concept and Vocabulary Check* on page 378 of the textbook.

#### Guided Practice:

- Review each of the following *Solved Problems* and complete each *Pencil Problem*.

**Objective #1:** Use a general strategy for factoring polynomials.

#### ✓ *Solved Problem #1*

**1a.** Factor:  $3x^3 - 30x^2 + 75x$

$$\begin{aligned} 3x^3 - 30x^2 + 75x &= 3x(x^2 - 10x + 25) \\ &= 3x(x - 5)^2 \end{aligned}$$

**1b.** Factor:  $3x^2y - 12xy - 36y$

$$\begin{aligned} 3x^2y - 12xy - 36y &= 3y(x^2 - 4x - 12) \\ &= 3y(x + 2)(x - 6) \end{aligned}$$

#### *Pencil Problem #1*

**1a.** Factor:  $x^3 - 16x$

**1b.** Factor:  $4x^2 + 25y^2$

**1c.** Factor:  $16a^2x - 25y - 25x + 16a^2y$

$$\begin{aligned} 16a^2x - 25y - 25x + 16a^2y &= 16a^2x + 16a^2y - 25y - 25x \\ &= (16a^2x + 16a^2y) + (-25y - 25x) \\ &= 16a^2(x + y) - 25(y + x) \\ &= 16a^2(x + y) - 25(x + y) \\ &= (x + y)(16a^2 - 25) \\ &= (x + y)(4a + 5)(4a - 5) \end{aligned}$$

**1c.** Factor:  $x^4 - xy^3 + x^3y - y^4$

**1d.** Factor:  $x^2 - 36a^2 + 20x + 100$

$$\begin{aligned} x^2 - 36a^2 + 20x + 100 &= x^2 + 20x + 100 - 36a^2 \\ &= (x^2 + 20x + 100) - 36a^2 \\ &= (x + 10)^2 - 36a^2 \\ &= (x + 10 + 6a)(x + 10 - 6a) \end{aligned}$$

**1d.** Factor:  $x^2 - 12x + 36 - 49y^2$

**Answers for Pencil Problems (Textbook Exercise references in parentheses):**

**1a.**  $x(x+4)(x-4)$  (5.6 #1)    **1b.** prime (5.6 #27)

**1c.**  $(x+y)(x-y)(x^2+xy+y^2)$  (5.6 #33)    **1d.**  $(x-6+7y)(x-6-7y)$  (5.6 #25)

**Homework:**

- Review the Section 5.6 summary** on page 398 of the textbook.
- Insert your homework** into this section of the *Learning Guide*. Show all work neatly and check your answers. Strive to work through difficulties when possible, making note of any exercises where you need additional help. Remember, even if your instructor assigns homework through *MyMathLab*, you should still write out your work.