Chapter 5 Section 3
Greatest Common Factors and Factoring by Grouping

Multiply polynomials: $7x(3x + 4) = 21x^2 + 28x$

Can reverse the process: $21x^2 + 28x = 7x(3x + 4)$. This process is called factoring.
Factoring: finding an equivalent expression that is a product.

Greatest Common Factor (GCF)
Find the greatest common factor between 21 and 28

Find the factors of each number
21: 1, 3, 7, 21

28: 1, 2, 4, 7, 14. 28

Look for the factors that are common to both: 1, 7
Pick the largest: 7

Try:
Find the GCF between

a) 20 and 36   b) $x^2 y^3$ and $x^3 y^4$

20: 1, 2, 4, 5, 10, 20
36: 1, 2, 3, 4, 9, 12, 18, 36

$x^2 y^3$: x x y y y
$x^3 y^4$: x x x y y y y

How many common x's: 2 so x^2
How many common y's: 3 so y^3
So, the GCF is: $x^2 y^3$

Example 2: page 343
Factor:
a) $9x^5 + 15x^3$ b) $12x^3 y^4 - 4x^4 y^3 + 2x^5 y^2$

Factor a negative
$-3x^3 + 12x^2 - 15x$

Factor by Grouping

Example 4: page 344
Factor:
a) $2(x - 7) + 9a(x - 7)$

What is the common factor?

Example 5: page 345

Factor: $x^3 - 5x^2 + 3x - 15$
Group terms that have a common factor. Group first two and last two
$\left(x^3 - 5x^2\right) + \left(3x - 15\right)$ Factor the common factor

Try: $4x^2 + 20x - 3xy - 15y$

Try to use the area model.

	x	5
4x	$4x^2$	20x
-3y	-3xy	-15y