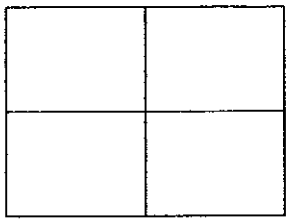
Factor By Grouping

Factor by Grouping: A way of factoring a polynomial with _____ terms! We use the Backwards Box Method!

The Backwards Box Method

Step 1: Factor out a GCF if one exists
Step 2: Put each term into the "box"
Step 3: Factor out the greatest common factor and put it on top (or on the side) of each box
Step 4: Check your factors by multiplying them together and getting a solution within each box
Step 5: Write your new factors as binomials!

Example 1: Factor $12x^3 + 3x^2 + 20x + 5$



Example 2: Factor $45w^4 - 36w^3 + 15w^2 - 12w$

Example 3: Factor $6g^3 + 18g^2 + 60g + 180$

Got it? Factor each of the following by grouping.

1. $21x^3 - 28x^2 - 6x + 8$
2. $8t^3 + 36t^2 + 2t + 9$
3. $6x^3 + 9x^2 + 2x + 3$
4. $21x^3 + 6x^2 - 28x - 8$
5. $32m^3 + 72m^2 - 80m - 180$
6. $30b^4 - 45b^3 - 10b^2 + 15b$
7. $60a^5 - 72a^4 - 210a^3 + 252a^2$
8. $12e^4 + 18e^3 + 36e^2 + 54e$

Math 1

7.6 Factor By Grouping

Unit 7

Factor by Grouping: A way of factoring a polynomial with 4 terms! We use the Backwards Box Method!

The Backwards Box Method

Step 1: Factor out a GCF if one exists
Step 2: Put each term into the "box"
Step 3: Factor out the greatest common factor and put it on top (or on the side) of each box
Step 4: Check your factors by multiplying them together and getting a solution within each box
Step 5: Write your new factors as binomials!

Example 1: Factor $12x^3 + 3x^2 + 20x + 5$

	$4x$	1
$3x^2$	$12x^3$	$3x^2$
5	$20x$	5

$(4x+1)(3x^2+5)$

Example 2: Factor $45w^4 - 36w^3 + 15w^2 - 12w$

$9w^3(5w-4) + 3w(5w-4)$

$(9w^3+3w)(5w-4)$

Example 3: Factor $6g^3 + 18g^2 + 60g + 180$

$6(g^3 + 3g^2 + 10g + 30)$

	g	$3g$
g^2	g^3	$3g^2$
10	$10g$	30

$6(g^2+10)(g+3)$

Got it? Factor each of the following by grouping.

1. $21x^3 - 28x^2 - 6x + 8$

$7x^2(3x-4) - 2(3x-4)$

$(7x^2-2)(3x-4)$

2. $8t^3 + 36t^2 + 2t + 9$

$4t^2(2t+9) + 1(2t+9)$

$(4t^2+1)(2t+9)$

3. $6x^3 + 9x^2 + 2x + 3$

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

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

4. $21x^3 + 6x^2 - 28x - 8$

$3x^2(7x+2) - 4(7x+2)$

$(3x^2-4)(7x+2)$

5. $32m^3 + 72m^2 - 80m - 180$

$8m^2(4m+9) - 20(4m+9)$

$(8m^2-20)(4m+9)$

6. $30b^4 - 45b^3 - 10b^2 + 15b$

$15b^3(2b-3) - 5b(2b-3)$

$(15b^3-5b)(2b-3)$

7. $60a^5 - 72a^4 - 210a^3 + 252a^2$

$12a^4(5a-6) - 42a^2(5a-6)$

$(12a^4-42a^2)(5a-6)$

8. $12e^4 + 18e^3 + 36e^2 + 54e$

$6e^3(2e+3) + 18e(2e+3)$

$(6e^3+18e)(2e+3)$