

## Warm - up

## Factor Fully

*Common*  $4x^2 - 6x^7 + 2x^2$   
 $= 2x^2(2 - 3x^5 + 1)$

*Trinomial*  $x^2 - x - 20$   
 $= (x - 5)(x + 4)$

$6x^2 - 7x - 5$   
 $\begin{array}{r|l} -30 & 3x - 5 \\ 3 & -10 \\ \hline -7 & 1 \end{array} \quad 2x \begin{array}{|l} 6x^2 - 10x \\ \hline 3x - 5 \end{array}$

*Grouping*  $x^2 - y^2 + 6x + 9$   
 $= x^2 + 6x + 9 - y^2$   
 $= (x + 3)^2 - y^2$   
 $= (x + 3 + y)(x + 3 - y)$

## Review - Factoring


- common
- trinomial --  $a=1$ ,  $a \neq 1$
- decomposition

**Common**

$$3x^5 + 6$$

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

$$4x^3 - 8x^7 + 2x^2$$

$$= 2x^2(2x - 4x^5 + 1)$$


**Factor**

$$x^2 + 4x + 3$$

$$\underline{3} \times \underline{1} = 3$$

$$\underline{3} + \underline{1} = 4$$

$$= (x + 3)(x + 1)$$

$$x^2 + x - 90$$

$$\underline{10} \times \underline{-9} = -90$$

$$\underline{10} + \underline{-9} = 1$$

$$= (x + 10)(x - 9)$$

## Trinomial

Multiply

$$(x+3)(x-4)$$

$$x^2 - x - 12$$

$$= x^2 + 3x - 4x - 12$$

$$= x(x+3) - 4(x+3)$$

$$= (x+3)(x-4)$$

$$(3x-2)(2x-5)$$

$$6x^2 - 19x + 10$$

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

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

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

$$\begin{array}{r} -12 \\ 3 \quad -4 \\ -1 \end{array}$$

$$\begin{array}{r} 60 \\ -15 \quad -4 \\ -19 \end{array}$$

Let's practice...at the Boards

1.  $\begin{array}{r} 9 \\ -3 \quad -3 \\ -6 \end{array}$

2.  $\begin{array}{r} 4 \\ 2 \quad 2 \\ 4 \end{array}$

3.  $\begin{array}{r} -30 \\ -13 \end{array}$

4.  $\begin{array}{r} -84 \\ 5 \end{array}$

5.  $\begin{array}{r} -24 \\ -5 \end{array}$

6.  $\begin{array}{r} 6 \\ -2 \quad -3 \\ -5 \end{array}$

7.  $\begin{array}{r} -15 \\ -14 \end{array}$

8.  $\begin{array}{r} -75 \\ -10 \end{array}$

9.  $\begin{array}{r} 12 \\ 7 \end{array}$

1. $\begin{array}{c} \diagup -36 \diagdown \\ \diagdown 16 \diagup \end{array}$	2. $\begin{array}{c} \diagup 1 \diagdown \\ \diagdown -2 \diagup \end{array}$	3. $\begin{array}{c} \diagup 24 \diagdown \\ \diagdown -14 \diagup \end{array}$
4. $\begin{array}{c} \diagup -12 \diagdown \\ \diagdown -4 \diagup \end{array}$	5. $\begin{array}{c} \diagup -72 \diagdown \\ \diagdown -21 \diagup \end{array}$	6. $\begin{array}{c} \diagup -1 \diagdown \\ \diagdown 0 \diagup \\   \quad -  \end{array}$
7. $\begin{array}{c} \diagup 13 \diagdown \\ \diagdown -14 \diagup \end{array}$	8. $\begin{array}{c} \diagup -34 \diagdown \\ \diagdown 15 \diagup \\ 17 \quad -2 \end{array}$	9. $\begin{array}{c} \diagup 9 \diagdown \\ \diagdown 6 \diagup \end{array}$

For **Complex Trinomials**, when  $a > 1$

We can use the  $\times$  method to factor quadratics by **decomposition**.

### Decomposition

1. Break the middle term up using the  $\times$
2. Factor by grouping.

$$\begin{aligned}
 3x^2 + 7x - 6 &= \underbrace{3x^2 + 9x}_{\text{group}} - \underbrace{2x - 6}_{\text{group}} \\
 &= 3x(x + 3) - 2(x + 3) \\
 &= (x + 3)(3x - 2)
 \end{aligned}$$

$\begin{array}{c} \diagup -18 \diagdown \\ \diagdown 9 \diagup -2 \\ 7 \end{array}$

$$24x^2 - 4x - 4$$

$$= 4(6x^2 - x - 1) \quad \text{common}$$

$$= 4(6x^2 - 3x + 2x - 1)$$

$$\begin{array}{ccc} & -6 & \\ -3 & \times & 2 \\ & -1 & \end{array}$$

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

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

### On the Boards...

$$6x^2 + 7x + 2$$

$$2x^2 + 13x + 15$$

$$2x^2 + 5x + 3$$

$$3x^2 - 2x - 5$$

# Seatwork

## Handouts

### Homework

1)  $x^2 - 7x - 18$

2)  $p^2 - 5p - 14$

3)  $m^2 - 9m + 8$

4)  $x^2 - 16x + 63$

5)  $7x^2 - 31x - 20$

6)  $7k^2 + 9k$

7)  $7x^2 - 45x - 28$

8)  $2b^2 + 17b + 21$

9)  $5p^2 - p - 18$

10)  $28n^4 + 16n^3 - 80n^2$

## Answers

1)  $x^2 - 7x - 18$

$$(x - 9)(x + 2)$$

2)  $p^2 - 5p - 14$

$$(p + 2)(p - 7)$$

3)  $m^2 - 9m + 8$

$$(m - 1)(m - 8)$$

4)  $x^2 - 16x + 63$

$$(x - 9)(x - 7)$$

5)  $7x^2 - 31x - 20$

$$(7x + 4)(x - 5)$$

6)  $7k^2 + 9k$

$$k(7k + 9)$$

7)  $7x^2 - 45x - 28$

$$(7x + 4)(x - 7)$$

8)  $2b^2 + 17b + 21$

$$(2b + 3)(b + 7)$$

9)  $5p^2 - p - 18$

$$(5p + 9)(p - 2)$$

10)  $28n^4 + 16n^3 - 80n^2$

$$4n^2(7n - 10)(n + 2)$$

## Attachments

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MCR3U - Factoring - ProductSum .pptx

MCR3U - Greatest Common Factor Complex Factoring.ppt

MCR3U\_Factoring\_5\_By\_Grouping\_4\_terms.tns