

Name: _____
PCH

Date: _____
Ms. Loughran

Do Now:
Factor each of the following completely.

1. $x^2 - 6x + 9 - 4y^2$

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

2. $a^2 - b^2 - 10b - 25$

$$a^2 - (b^2 + 10b + 25)$$
$$a^2 - (b+5)^2$$
$$(a - (b+5))(a + b+5)$$
$$(a - b - 5)(a + b + 5)$$

3. $(x+4)^3 - 9x - 36$

$$(x+4)^3 - 9(x+4)$$
$$(x+4)[(x+4)^2 - 9]$$
$$(x+4)(x+4-3)(x+4+3)$$
$$(x+4)(x+1)(x+7)$$

4. $8x^4 + 10x^2 - 3$

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

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PCH: Factoring Polynomials with 6 Terms by Grouping

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Factor each completely.

1. $2x^3 + 3x^2 - 5x + 8x^2y + 12xy - 20y$

$$x(2x^2 + 3x - 5) + 4y(2x^2 + 3x - 5)$$

$$(x + 4y)(2x^2 + 3x - 5)$$

$$(x + 4y)(2x + 5)(x - 1)$$

2. $x^4 - 9x^2 - 6x^3 + 54x - 7x^2 + 63$

$$x^2(x^2 - 9 - 6x)$$

~~$$x^2(x^2 - 6x - 9) - 7(x^2 - 6x - 9)$$~~

$$x^4 - 9x^2 - 6x^3 + 54x - 7x^2 + 63$$

$$x^2(x^2 - 9) - 6x(x^2 - 9) - 7(x^2 - 9)$$

$$(x^2 - 9)(x^2 - 6x - 7)$$

$$(x - 3)(x + 3)(x - 7)(x + 1)$$

2 groups of
3

doesn't work

could rearrange
or

3 groups of

2
works!

$$3. \quad x^4 - 25x^2 - 4x^3 + 100x - 12x^2 + 300$$

$$x^2(x^2 - 25) - 4x(x^2 - 25) - 12(x^2 - 25)$$

$$(x^2 - 4x - 12)(x^2 - 25)$$

$$(x - 6)(x + 2)(x - 5)(x + 5)$$

$$4. \quad x^3 - 10x^2 + 21x - 4x^2y^2 + 40xy^2 - 84y^2$$

$$x(x^2 - 10x + 21) - 4y^2(x^2 - 10x + 21)$$

$$(x - 4y^2)(x^2 - 10x + 21)$$

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

Classwork/Homework 09-11



Name: _____

PCH - Mixed Factoring Practice

Factor each expression completely:

1) $3x^2 - 11xy - 4y^2$

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

could still split the middle

$3x^2 - 12xy + xy - 4y^2$
 $3x(x - 4y) + y(x - 4y)$
 $(3x + y)(x - 4y)$

2) $10x^4 - 11x^2y - 6y^2$

$(5x^2 + 2y)(2x^2 - 3y)$

could use splitting the middle

$10x^4 - 15x^2y + 4x^2y - 6y^2$
 $5x^2(2x^2 - 3y) + 2y(2x^2 - 3y)$
 $(5x^2 + 2y)(2x^2 - 3y)$

3) $x^{10} + 2x^5y^5 + y^{10}$

$(x^5 + y^5)^2$

4) $x^2 - 2xy^7 + y^{14}$

$(x - y^7)^2$

Remember to check if you are looking at a perfect square trinomial

5) $4x^4 - 12x^2y^{11} + 9y^{22}$

$(2x^2 - 3y^{11})^2$

6) $3x^3(2x+3)^5 + 15x^2(2x+3)^5 - 6x(2x+3)^5$

$3x(2x+3)^{-3/5} (x^2 + 5x - 2(2x+3)) = 3x(2x+3)^{-3/5} (x^2 + x - 6)$

7) $4(x-1)^2 - 81$

$(2(x-1) - 9)(2(x-1) + 9) = (2x - 11)(2x + 7)$

$= 3x(2x+3)^{-3/5} (x-2)(x+3)$

8) $16x^4 - 54xy^{12}$

$2x(8x^3 - 27y^{12}) = 2x(2x - 3y^4)(4x^2 + 6xy^4 + 9y^8)$

9) $7(5x^4+1)^2 + 11(5x^4+1) - 6$

$(7y - 3)(y + 2) = (7(5x+1) - 3)(5x+1+2)$
 $(35x + 4)(5x+3)$

10) $5x^{\frac{2}{3}} - 19x^{\frac{1}{3}} - 4$

let $u = x^{\frac{1}{3}}$

or could split the middle

$5u^2 - 19u - 4$

$(5u + 1)(u - 4)$

$(5x^{\frac{1}{3}} + 1)(x^{\frac{1}{3}} - 4)$

$5x^{\frac{2}{3}} - 20x^{\frac{1}{3}} + x^{\frac{1}{3}} - 4$
 $5x^{\frac{1}{3}}(x^{\frac{1}{3}} - 4) + 1(x^{\frac{1}{3}} - 4)$
 $(5x^{\frac{1}{3}} + 1)(x^{\frac{1}{3}} - 4)$

$5x^{\frac{1}{3}+1} x^{\frac{1}{3}-2} x^{\frac{1}{3}+2}$

NOTS