

Name: \_\_\_\_\_  
PCH: Review of Factoring

Date: \_\_\_\_\_  
Ms. Loughran

When factoring a polynomial go through this list in your mind:

1. **GCF:** Look for all factors that are common to all terms of the polynomial, pull out the greatest common factor.
2. **Difference of two squares:** If the polynomial is a binomial, look to see if it is the difference of two squares.

$$a^2 - b^2 = (a+b)(a-b)$$

- Remember you can NOT factor the sum of two squares.

3. **Difference or sum of two cubes:** If the polynomial is a binomial, look to see if it is the sum or difference of two cubes.

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

4. Trinomials:  $ax^2 + bx + c$  If the polynomial is a trinomial then look at the leading coefficient,  $a$ .

If the leading coefficient is one ( $a = 1$ ), use the <sup>AM</sup> add multiply method. Look for numbers that multiply to  $c$  while adding to  $b$ .

If the leading coefficient is not equal to one ( $a \neq 1$ ) use factoring by trial and error or the AC method.

*The AC Method / Splitting the method*

- a. Form the product  $ac$
- b. Find a pair of numbers whose product is  $ac$  and whose sum is  $b$
- c. Rewrite the polynomial so that the middle term ( $bx$ ) is written as the sum of the two terms whose coefficients are the two numbers found in step b
- d. Factor by grouping

5. **Grouping:** If the polynomial has 4 terms, try factoring by grouping.

6. **Final check:** Always make sure that the factors you end up with are completely factored. If you have overlooked a common factor, you can catch it here.

### Exercises

1)  $2x^2 - 18 = 2(x^2 - 9) = 2(x+3)(x-3)$

2)  $3y^2 - 48$

3)  $a^4 - 16 = (a^2 + 4)(a^2 - 4) = (a^2 + 4)(a - 2)(a + 2)$

4)  $5a^2 - 30a + 45$

5)  $4a^2 + 16a + 16$

6)  $-x^2 + 50x - 625$

7)  $ax - bx + ay - by$

8)  $2ax + 3 + x + 6a$

9)  $x^3 - 3x^2 - 9x + 27$

10)  $3x^2 + 5x - 2$   
 $(3x - 1)(x + 2)$

11)  $12a^2b^2 - 3ab$

12)  $x^2 - 4x + 2xy - 8y$

13)  $x^2 - 16y^2$

14)  $x^2 - 9x + 18$

15)  $3a^2 - 2ax - 3a + 2x$

16)  $a^2 - 2a + ab - 2b$

17)  $6x^2 + 13x + 6$

18)  $x^4 - 11x^3 + 24x^2$

19)  $8x^2 - 6x - 2$

20)  $9x^2 - 12x + 4$

21)  $a^3 - a^2b - a + b$

22)  $x^2 + 6x + 5$

23)  $x^2 - 4x + 3$

24)  $n^2 + 5n + 6$

25)  $n^2 - 10n + 25$

26)  $nr^2 + 3ms - 4s^2$

27)  $y^2 + 4y - 12$

28)  $y^2 - y - 30$

29)  $t^2 - 14t - 72$

30)  $6 - x - x^2$

31)  $36 + 5x - x^2$

32)  $36s^2 + 12s + 1$  *\* perfect sq. trinomial*  
 $(6s + 1)(6s + 1) = (6s + 1)^2$

33)  $6s^2 + 30s - 900$

34)  $2a^4 - 10a^3 - 72a^2$

35)  $2x^3 - 3x^2 - 2x + 3$

36)  $(x - 1)^2 - 4$  *let m = x - 1*  
 $(x - 1 - 2)(x - 1 + 2)$   $m^2 - 4$   
 $(x - 1 - 2)(x - 1 + 2)$   $(m - 2)(m + 2)$   
 $(x - 3)(x + 1)$   $(x - 3)(x + 1)$

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

38)  $16 - (2x - 1)^2$

39)  $4a^2 - 4ab - 36 + b^2$

40)  $2a^3 - 16a^2 + 32a$