Algebra II Name_____

Factor: Difference of Squares & Grouping Period_____Date_____

Factor each of the following polynomials completely, using a **difference of squares** and/or **Greatest Common Factor**. If the polynomial cannot be factored, write <u>prime</u>.

1.) $32\boldsymbol{x}^2 - 18\boldsymbol{y}^2$

2.) $100\boldsymbol{x}^4 - 169$

3.) $121\boldsymbol{y}^2 - \boldsymbol{x}^2$

4.) $\boldsymbol{n}^8 - 1$

5.) $-54\boldsymbol{a}^4 + 24\boldsymbol{b}^2$

6.) $(3\boldsymbol{x} + 4)^2 - 49$

So far we have factored polynomials with two and three terms. In this worksheet we are going to learn a method of factoring with four terms (grouping). We need four or even number of terms since we are going to divide the terms into groups with the same number of terms. We then take the GCF out of each group. Hopefully this will result in having the same factor in each group. Finally, we combine groups by adding like terms.

<u>Examples</u> of Factoring by grouping:

- $6ab + 4a + 3b + 2$
  $= (6ab + 4a) + (3b + 2)$ Grouped using ( )
  $= 2a\mathbf{(3b + 2)} + 1\mathbf{(3b + 2)}$ Factored a GCF from each group, <u>notice the 1</u>
  $= (2a + 1)(3b + 2)$ Added like terms **(3b + 2)**
- $2x^2 - 8xz - 2xy + 8yz$
  $= (2x^2 - 8xz) + (-2xy + 8yz)$ Grouped using ( ), <u>notice the signs</u>
  $= 2x\mathbf{(x - 4z)} + -2y\mathbf{(x - 4z)}$ Factored a GCF from each group
  $= (2x - 2y)(x - 4z)$ Added like terms **(x – 4z)**

Factor the following polynomials by grouping.

1. $6mn - 9m - 4n + 6$
2. $2x^2y + 6xy - x - 3$
3. $6xy^2 - 3xy + 8y - 4$
4. $8x^2 + 2xy + 12x + 3y$

5. $2ef^2 - 12ef + 3f - 18$

6. $ac + bd + bc + ad$

7. $6cd^2 - 8cd - 9d + 12$

8. $m^3 - 5n + 5m - m^2n$

9. $4r^2s - 8rs - 3r + 6$

10. $x^3 + xy^2 - x^2y - y^3$

11. $4k + 12 + k^2 + 3k$

12. $6x^3 + 9x - 4x^2 - 6$

13. $2uv - u^2v - 6 + 3u$

14. $a^3 + b^2 + a^2b + ab$

15. $xz + xw + yz + yw$

16. $c^2d^2 + xy + d^2x + c^2y$

17. $2ac + ad + 6bc + 3bd$

18. $3j - 5j^2 - 6k + 10jk$

19. $2c^2d + 9c + 6cd + 3c^2$

20. $3v^2 - 9v - vw + 3w$

21. $z^3 - 6 + 2z - 3z^2 = 0$

22. $2xz - 6xy + 2yz - 6y^2$

23. $p^2q + pq - 1 - p$

24. $r^3s^2 - 2r^2s + 2rs - 4$