

**Sub instructions-The following work sheet is located on the top of the file cabinet.**

**Please have students complete and turn in work.**

**Factoring Review Sheet**

*Factoring Using GCF:*

To factor using a GCF, take the greatest common factor (GCF), for the numerical coefficient. When choosing the GCF for the variables, if all terms have a common variable, take the ones with the lowest exponent.

Example:  $9x^4 + 3x^3 + 12x^2$

GCF: Coefficients = 3  
Variables (x) =  $x^2$

GCF =  $3x^2$

Next, you just divide each monomial by the GCF!

Answer =  $3x^2(3x^2 + x + 4)$

Then, check by using the distributive property!

Factor each of the following using the GCF and check by using the distributive property:

1)  $2a + 2b$

2)  $5x^2 + 5$

3)  $18c - 27d$

4)  $hb + hc$

5)  $6x - 18$

6)  $3a^2 - 9$

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

8)  $p + prt$

9)  $10x - 15x^3$

10)  $2x - 4x^3$

11)  $8x - 12$

12)  $8 - 4y$

13)  $3ab^2 - 6a^2b$

14)  $10xy - 15x^2y^2$

15)  $21r^3s^2 - 14r^2s$

16)  $2x^2 + 8x + 4$

17)  $6c^3d - 12c^2d^2 + 3cd$

18)  $3x^2 - 6x - 30$

19)  $ay - 4aw - 12a$

20)  $c^3 - c^2 + 2c$

21)  $2ma + 4mb + 2mc$

22)  $9ab^2 - 6ab - 3a$

23)  $15x^3y^3z^3 - 5xyz$

24)  $24x^{11} + 4x^{10} - 6x^9 + 2x^8$

25)  $26x^4y - 39x^3y^2 + 52x^2y^3 - 13xy^4$

26)  $16x^5 + 12xy - 9y^5$

*Factoring Trinomials (Case I):*

Case I is when there is a coefficient of 1 in front of your variable<sup>2</sup> term ( $x^2$ ).

You have two hints that will help you:

- 1) When the last sign is addition, both signs are the same and match the middle term.
- 2) When the last sign is subtraction, both signs are different and the larger number goes with the sign of the middle term.

Examples:

Hint #1:

$$x^2 - 5x + 6$$

$$(x - \quad)(x - \quad)$$

Find factors of 6, w/ sum of 5.

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

CHECK USING FOIL

Hint #2:

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

$$(x - \quad)(x + \quad)$$

Find factors of 36 w/ difference of 5.

$$(x - 4)(x + 9)$$

CHECK USING FOIL

Factor each trinomial into two binomials and check using FOIL:

1)  $a^2 + 3a + 2$

2)  $c^2 + 6c + 5$

3)  $x^2 + 8x + 7$

4)  $r^2 + 12r + 11$

5)  $m^2 + 5m + 4$

6)  $y^2 + 12y + 35$

7)  $x^2 + 11x + 24$

8)  $a^2 + 11a + 18$

9)  $16 + 17c + c^2$

10)  $x^2 + 2x + 1$

11)  $z^2 + 10z + 25$

12)  $a^2 - 8a + 7$

13)  $a^2 - 6a + 5$

14)  $x^2 - 5x + 6$

15)  $x^2 - 11x + 10$

16)  $y^2 - 6y + 8$

17)  $15 - 8y + y^2$

18)  $x^2 - 10x + 24$

19)  $c^2 - 14c + 40$

20)  $x^2 - 16x + 48$

21)  $x^2 - 14x + 49$

22)  $x^2 - x - 2$

23)  $x^2 - 6x - 7$

24)  $y^2 + 4y - 5$

25)  $z^2 - 12z - 13$

26)  $c^2 - 2c - 15$

27)  $c^2 + 2c - 35$

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

29)  $z^2 + 9z - 36$

30)  $x^2 - 13x - 48$

31)  $x^2 - 16x + 64$

32)  $x^2 - 11x - 42$

33)  $x^2 - 9$

34)  $x^2 - 36$

35)  $x^2 - 121$

36)  $64x^2 - 81$

37)  $9x^2 - 25$

38)  $144x^2 - 49$

39)  $x^2 - 225$

40)  $x^2 + 100$

41)  $x^2 - 44$

42)  $x^2 - x - 9$

43)  $x^2 - 8x + 17$

44)  $x^2 + 64$

*Factoring Trinomials (Case II):*

Use Case II when a trinomial has a coefficient other than 1 for the  $x^2$  term.

Let's look at the following example:  $6x^2 + 5x - 4$

- 1) **Look for a GCF:** There is no GCF for this trinomial and the only way this method works is if you take it out right away.

- 2) **Take the coefficient for  $x^2$  (6) and multiply it with the last term (4):**

$$\begin{array}{l} 6x^2 + 5x - 4 \\ x^2 + 5x - 24 \end{array} \quad 6 * 4 = 24$$

3) **Factor the new trinomial using Case I:**

$$\begin{array}{l} x^2 + 5x - 24 \\ (x + 8)(x - 3) \end{array}$$

4) **Take the coefficient that you multiplied in the beginning (6) and put it back in the parenthesis (only with the x):**

$$\begin{array}{l} (x + 8)(x - 3) \\ (6x + 8)(6x - 3) \end{array}$$

5) **Find the GCF on each factor (of each set of parenthesis):**

$$\begin{array}{l} (6x + 8) = 2(3x + 4) \\ (6x - 3) = 3(2x - 1) \end{array}$$

6) **Keep the factor left in parenthesis:**

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

7) **Foil Check**

Factor each of the following:

- |                      |                       |                      |                       |
|----------------------|-----------------------|----------------------|-----------------------|
| 1) $2x^2 + 15x + 7$  | 2) $3x^2 - 5x - 12$   | 3) $9x^2 + 11x + 2$  | 4) $7x^2 - 22x + 3$   |
| 5) $18x^2 - 9x - 2$  | 6) $4x^2 + -7x - 2$   | 7) $2x^2 + 13x + 21$ | 8) $11x^2 - 98x - 9$  |
| 9) $3x^2 - 20x - 63$ | 10) $3x^2 - 20x - 7$  | 11) $8x^2 + 13x - 6$ | 12) $4x^2 - 17x - 42$ |
| 13) $2x^2 - 9x - 18$ | 14) $6x^2 + 17x - 14$ | 15) $3x^2 + 5x - 12$ | 16) $2x^2 + 9x + 4$   |

*Factoring Completely:*

When asked to factor completely, you will have to use a combination of the methods that we have used previously.

Factor Completely:

- |                            |                            |                      |                         |
|----------------------------|----------------------------|----------------------|-------------------------|
| 1) $4x^2 + 20x + 24$       | 2) $10x^2 - 80x + 150$     | 3) $9x^2 + 90x - 99$ | 4) $3x^3 + 27x^2 + 60x$ |
| 5) $12x^6 + 27x^5 + 60x^4$ | 6) $8x^9 + 24x^8 + 192x^7$ |                      |                         |