


7.2 Factoring Review

| What you need to know & be able to do | Things to remember | Examples | |
|---------------------------------------|---|---|--|
| 1. Factor by GCF | -Break down each term and circle what factors are common to both (that comes out) -What is leftover stays in the parenthesis | 1. $\frac{x^2 - 12x}{x \quad x}$ $x(x-12)$ | 2. $\frac{-8y^2 - 2y}{-2y \quad -2y}$ $-2y(4y + 1)$ |
| 2. Factor a = 1 | Always check for a GCF first! Think of what two factors multiply to get the "c" term and add to get the "b" term | 3. $x^2 - 15x + 44$ $(x-11)(x-4)$ | 4. $x^2 + 5x - 36$ $(x-4)(x+9)$ |
| | | 5. $x^2 - 9$ $(x+3)(x-3)$ | 6. $x^2 - 12x + 36$ $(x-6)^2$ |
| 3. Factor A not 1 | Always check for a GCF first! | 7. $2x^2 + 9x + 4$ $\begin{array}{c c} 4 & 9x \\ \hline (2x+2)(x+2) & 4x+2x = 6x \text{ No} \\ (2x+4)(x+1) & 2x+4x = 6x \text{ No} \\ (2x+1)(x+4) & 8x+1x = 9x \text{ Yes} \end{array}$ $(2x+1)(x+4)$ | 8. $4x^2 - 4x - 3$ $\begin{array}{c c} \hat{4} & \hat{-3, 1} \\ \hline 4x, x & -3, 1 \\ 2x, 2x & 3, -1 \end{array}$ $\begin{array}{c c} -4x & -3 \\ \hline (2x-1)(2x+3) & 6x + -2x = 4x \text{ No!} \\ (2x+1)(2x-3) & -6x + 2x = -4x \text{ Yes!} \end{array}$ $(2x+1)(2x-3)$ |

| | | | | | | | | | | | | | | | | | | | |
|-------------------------|---|---|---|----|--------------|----------------|--------------|-----------------|--------------|----------------|--------------|---------------|--|----|---|--------------|--------------|--------------|-------------|
| 4. Factor a = 1 & GCF | Always check for a GCF first! | $\frac{6x^2 - 54x + 48}{6 \quad 6 \quad 6}$ $6(x^2 - 9x + 8)$ $\boxed{6(x-8)(x-1)}$ | $10. x^3 + 10x^2 + 24x$ $x(x^2 + 10x + 24)$ $\boxed{x(x+6)(x+4)}$ | | | | | | | | | | | | | | | | |
| 5. Factor a not 1 & GCF | Always check for a GCF first! | $11. \frac{6x^2 + 8x - 8}{2 \quad 2 \quad 2}$ $2(3x^2 + 4x - 4)$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">-4</td> <td style="text-align: center;">4x</td> </tr> <tr> <td style="text-align: center;">2(3x-4)(x+1)</td> <td style="text-align: center;">3x + -4x = -1x</td> </tr> <tr> <td style="text-align: center;">2(3x+1)(x-4)</td> <td style="text-align: center;">-12x + 4x = -8x</td> </tr> <tr> <td style="text-align: center;">2(3x+2)(x-2)</td> <td style="text-align: center;">-6x + 4x = -2x</td> </tr> <tr> <td style="text-align: center;">2(3x-2)(x+2)</td> <td style="text-align: center;">6x + -2x = 4x</td> </tr> </table> $\boxed{2(3x-2)(x+2)}$ | -4 | 4x | 2(3x-4)(x+1) | 3x + -4x = -1x | 2(3x+1)(x-4) | -12x + 4x = -8x | 2(3x+2)(x-2) | -6x + 4x = -2x | 2(3x-2)(x+2) | 6x + -2x = 4x | $12. \frac{4x^2 + 2x - 2}{2 \quad 2 \quad 2}$ $2(2x^2 + x - 1)$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">-1</td> <td style="text-align: center;">x</td> </tr> <tr> <td style="text-align: center;">2(2x+1)(x-1)</td> <td style="text-align: center;">-2x + x = -x</td> </tr> <tr> <td style="text-align: center;">2(2x-1)(x+1)</td> <td style="text-align: center;">2x + -x = x</td> </tr> </table> $\boxed{2(2x-1)(x+1)}$ | -1 | x | 2(2x+1)(x-1) | -2x + x = -x | 2(2x-1)(x+1) | 2x + -x = x |
| -4 | 4x | | | | | | | | | | | | | | | | | | |
| 2(3x-4)(x+1) | 3x + -4x = -1x | | | | | | | | | | | | | | | | | | |
| 2(3x+1)(x-4) | -12x + 4x = -8x | | | | | | | | | | | | | | | | | | |
| 2(3x+2)(x-2) | -6x + 4x = -2x | | | | | | | | | | | | | | | | | | |
| 2(3x-2)(x+2) | 6x + -2x = 4x | | | | | | | | | | | | | | | | | | |
| -1 | x | | | | | | | | | | | | | | | | | | |
| 2(2x+1)(x-1) | -2x + x = -x | | | | | | | | | | | | | | | | | | |
| 2(2x-1)(x+1) | 2x + -x = x | | | | | | | | | | | | | | | | | | |
| 6. Special Products | <p>Difference of Two Squares: $a^2 - b^2 = (a + b)(a - b)$ "b" term = 0</p> <p>Perfect Square Trinomial: $(a + b)^2 = a^2 + ab + b^2$ $(a - b)^2 = a^2 - ab + b^2$</p> | $13. x^2 - 49$ $(x+7)(x-7)$ | $14. 25x^2 - 9$ $(5x+3)(5x-3)$ | | | | | | | | | | | | | | | | |
| | | $15. 4x^2 - 1$ $(2x+1)(2x-1)$ | $16. x^2 - 10x + 25$ $(x-5)(x-5)$ <p style="text-align: center;">or</p> $(x-5)^2$ | | | | | | | | | | | | | | | | |
| 7. Area & Perimeter | <p>Perimeter: Add up all outside sides</p> <p>Area: Rectangle: $A = l \times w$ Triangle: $A = \frac{1}{2}bh$</p> | $17. \text{The area of a rectangle is } x^2 + 7x + 6. \text{ What is the perimeter of this rectangle?}$ $(x+1)(x+6)$  | $P = x+1$ $x+1$ $x+6$ $x+6$ $\boxed{4x+14}$ | | | | | | | | | | | | | | | | |

Make sure you know your graphic organizer so you know which method to use to factor.

7.2 Learning Goal - Factoring Polynomials

Name: Key

Date: _____

1. Which is a factor of $x^2 - 11x + 24$?

- A. $x+3$ B. $x-3$ C. $x+4$ D. $x-4$

$$(x-3)(x-8)$$

2. Which of the following is one of the factors of the expression below?

$$4x^2 - 25 = (2x+5)(2x-5)$$

- A. $(4x-5)$ B. $(2x+1)$
C. $(4x-1)$ D. $(2x-5)$

3. What is the factored form of the expression below?

$$x^2 - 16 = (x+4)(x-4)$$

- A. $(x-4)(x+4)$ B. $(x-8)(x+8)$
C. $(x-4)(x-4)$ D. $(x-8)(x-8)$

4. Which shows the polynomial $8x^2 + 16x + 8$ completely factored?

- A. $(4x+4)^2$ B. $(4x+4)(2x+2)$
C. $8(x+1)^2$ D. $8(x+1)(x-1)$

$$\frac{8x^2}{8} + \frac{16x}{8} + \frac{8}{8}$$

$$8(x^2 + 2x + 1)$$

$$8(x+1)(x+1)$$

$$8(x+1)^2$$

5. What is the factored form of the expression below?

$$5x^2 + 13x - 6$$

- A. $(5x+1)(x-6)$ B. $(5x-2)(x+3)$
C. $(5x+2)(x-3)$ D. $(5x-1)(x+6)$

| | |
|---------------|------------------------|
| -6 | $13x$ |
| $(5x-3)(x+2)$ | $10x + -3x = 7x$ No |
| $(5x-2)(x+3)$ | $15x + -2x = 13x$ Yes! |

6. Which binomial is a factor of $3x^2 + 2x - 5$?

- A. $3x-1$ B. $x-1$ C. $3x-5$ D. $x-5$

| | |
|---------------|---------------------|
| -5 | $2x$ |
| $(3x-5)(x+1)$ | $3x + -5x = -2x$ No |
| $(3x+5)(x-1)$ | $-3x + 5x = 2x$ Yes |

7. If $x - 3$ is a factor of $x^2 + x - 12$, then the other factor is

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

- A. $4x - 3$ B. $3x - 4$ C. $x - 4$ D. $x + 4$

8. Written in factored form, the trinomial $2x^2 - 3x - 5$ is equivalent to

- A. $(2x - 1)(x + 5)$ B. $(2x + 5)(x - 1)$
 C. $(2x - 5)(x + 1)$ D. $(2x + 1)(x - 5)$

$$\begin{array}{r|l} -5 & -3x \\ \hline (2x-5)(x+1) & 2x + -5x = -3x \end{array}$$

9. When factored completely, $x^3 - 9x$ is equivalent to

- A. $x(x - 3)$ B. $x(x + 3)(x - 3)$
 C. $(x + 3)(x - 3)$ D. $x(x + 3)$

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

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

10. Which expression is factored form $2x^2 - 2x - 12$?

- A. $2(x + 2)(x - 3)$ B. $2(x + 6)(x - 1)$
 C. $2(x + 3)(x - 2)$ D. $2(x + 1)(x - 6)$

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

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

11. If $(x - 3)$ and $(x + 7)$ are the factors of the trinomial $x^2 + ax - 21$, what is the value of a ?

- A. -3 B. -4 C. 7 D. 4

$$(x-3)(x+7) = x^2 + 7x - 3x - 21$$

$$x^2 + 4x - 21$$

12. If $(2x - 3)$ and $(x + 5)$ are multiplied to form the trinomial $ax^2 + bx + c$, what is the value of b ?

- A. -15 B. 2 C. 7 D. 4

$$(2x-3)(x+5) = 2x^2 + 10x - 3x - 15$$

$$2x^2 + 7x - 15$$