

9-7 Factoring Special Cases

Factor the following:

$$1. \quad x^2 + \textcircled{0}x - 25 \quad \begin{array}{r} 25 \\ 1, 25 \end{array}$$

$$(x+5)(x-5) \quad 5, 5$$

$$2. \quad x^2 + \textcircled{0}x - 49 \quad \begin{array}{r} 49 \\ 1, 49 \end{array}$$

$$(x+7)(x-7) \quad 7, 7$$

$$3. \quad x^2 + \textcircled{0}x - 9 \quad \begin{array}{r} 9 \\ 1, 9 \end{array}$$

$$(x-3)(x+3) \quad 3, 3$$

These are special cases called a **difference of perfect squares**. With a difference of perfect squares, the middle term is not written because it is 0, so as a result you factor a binomial into a product of two binomials. These factor as follows:

$$a^2 - b^2 = (a \oplus b)(a \ominus b)$$

↑

In order to factor these you must recognize the perfect squares. These are the numbers you get when you multiply an integer times itself.

List the Important Integer Perfect Squares:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196,

225

Variable Perfect Squares: A variable with an **EVEN Exponent**.

Let's try a few!

*** BUT WAIT!! ALWAYS LOOK FOR A ^{GCF} ~~GFC~~ BEFORE FACTORING! ***

$$1. \quad x^2 - 81$$

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

$$2. \quad 16x^2 - 49$$

$$(4x+7)(4x-7)$$

$$\begin{array}{r} 16 \\ 1, 16 \\ 2, 8 \\ 4, 4 \end{array}$$

Check

$$x^2 + 9x - 9x - 81$$

$$x^2 - 81$$

Check

$$\begin{array}{r} 4x - 7 \\ 4x \quad \begin{array}{|c|c|} \hline 16x^2 & -28x \\ \hline +28x & -49 \\ \hline \end{array} \\ +7 \end{array}$$

$$\begin{array}{r} 49 \\ 1, 49 \\ 7, 7 \end{array}$$

$$16x^2 + 28x - 28x - 49$$

$$16x^2 - 49$$

GCF

Trinomial

Dops

Factor

3. $x^2 - 121$

$$(x - 11)(x + 11)$$

4. $x^2 - 64$

$$(x + 8)(x - 8)$$

5. $25x^2 - 4y^2$

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

6. $x^2 - 3x - 10$

$$(x + 2)(x - 5) \quad \begin{array}{r} 10 \\ 1, 10 \\ 2, 5 \end{array}$$

7. $12n^2m^6 + 8n^4m^5$

$$4n^2m^5(3m + 2n^2)$$

8. $100 - 49x^6$

$$(10 + 7x^3)(10 - 7x^3)$$

9. $x^2 + 5x - 24$

$$(x + 8)(x - 3) \quad \begin{array}{r} 24 \\ 1, 24 \\ 2, 12 \\ 3, 8 \\ 4, 6 \end{array}$$

10. $x^2 - 36$

$$(x + 6)(x - 6)$$

11. $x^4 - y^{10}$

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

12. $x^2 \oplus 64$

↑ not subtraction

Doesn't Factor

13. $81x^2 - 4$

$$(9x - 2)(9x + 2)$$

14. $20a^5 - 15a^4 - 10a$

$$5a(4a^4 - 3a^3 - 2)$$

Practice 9-7

Name _____

Factor

 1. $x^2 - 144$

2. $x^2 - 1$

3. $36a^2 - 25b^2$

4. $x^2 + 19x + 60$

5. $16x^8 - 9$

6. $21x^3 + 14x$



7. $x^2 - 64$

8. $x^2 - x - 56$

9. $x^3y^6 - x^2y^5 + xy^7$

10. $4x^2 - 169y^2$

