



Name \_\_\_\_\_

Per \_\_\_\_\_

**Algebra 2 CP Class Log 4-4 to 4-5**

## Quadratic Functions: Solving by factoring and graphing

| #  | Date | Title   | Self Check & Teacher Check |
|----|------|---|----------------------------|
| 1. |      | 4-4a Factoring Quadratic Expressions: Distributive Property, FOIL and GCF NOTES | 1.                         |
| 2. |      | #2 Finish handout   | 2.                         |
| 3. |      | 4-4b Factoring Quadratic Expressions: Snowflake NOTES                           | 3.                         |
| 4. |      | #4 Book 4-4 p221 (14-31, 38-46)   | 4.                         |
| 5. |      | 4-4c Factoring Quadratic Expressions: Special Cases                             | 5.                         |
| 6. |      | #6 Book 4-4 p221 (47-55, 58-63)   | 6.                         |
| 7. |      | 4-5 Quadratic Equations: Factoring NOTES  | 7.                         |
| 8. |      | #8 Book 4-5 p229 (9-17, 36)   | 8.                         |

**Quiz 4.4-5**

|     |  |   |     |
|-----|--|---|-----|
| 9.  |  | 4-5 Quadratic Equations: Graphing NOTES | 9.  |
| 10. |  | #10 Book 4-5 p229 (18-35)               | 10. |
| 11. |  | Review                                  | 11. |

**Test 4.4-5**

Class logs are due the day of the test. Attach any unstamped work for credit.

Key: Stamp/ ✓ = Full credit L(ate)/i(ncomplete) = ½ credit ?/x/blank = 0 credit

**Algebra 2**  
**4-4a Factoring Quadratics**

Name \_\_\_\_\_  
Date \_\_\_\_\_ **A#1-2**

**Goal:** Use the distributive property to multiply and factor polynomials



**Warm Up:** Simplify each expression.

1.  $-3(4x + 3)$       2.  $2x(x - 4)$       3.  $(-2a + 12)(-3a)$       4.  $-11x(-3x - 7)$

**Vocabulary**

Factor: (n) \_\_\_\_\_ Ex: What are the factors of 12?  
(v) \_\_\_\_\_ Ex: Factor  $2x + 4$ .

Greatest Common Factor (GCF):

- a. 12, 36      b.  $15x, 20x$       c.  $-24x^2, -16x$

**Example 1:** Factor each expression completely.

- a.  $14m^2 - 7m$       b.  $48x^2 - 24x + 36$       c.  $9x^2 + 18$

**Practice:** Factor each expression completely.

1.  $6x^2 - 9$       2.  $16m^2 + 8m$       3.  $2a^2 + 22a + 60$       4.  $5x^2 + 25x - 70$

5.  $\frac{1}{3}x^2 + \frac{1}{3}x - 4$       6.  $-7x^2 + 7x + 14$       7.  $-3x^2 - 3x + 60$       8.  $-5xy^2 - 30xy - 25x$

**Algebra 2**  
**4-4a Factoring Quadratics**

**A#1-2**

**Example 2: Distributive Property Extended:** Simplify the expression  $(3x - 4)(x + 5)$

| Box Method        | Double Distribution | FOIL              |
|-------------------|---------------------|-------------------|
| $(3x - 4)(x + 5)$ | $(3x - 4)(x + 5)$   | $(3x - 4)(x + 5)$ |

**Practice:** Simplify each expression.

9.  $(3a - 4)(2a - 4)$

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

11.  $(x + 3)(x - 3)$

12.  $(x + 10)(x - 10)$

13.  $(x + 3)^2$

14.  $(x - 9)^2$

15.  $(4x + 3)(x - 3)$

16.  $(-2x + 5)(3x - 3)$

17.  $(3a + 12)(2a - 3)$

18.  $(4x + 3)^2$

19.  $(4x - 5)(4x + 5)$

20.  $(3a + 12)^2$

**Algebra 2**  
**4-4b Factoring Quadratics**

Name \_\_\_\_\_  
 Date \_\_\_\_\_ A#3

**Goal:** To factor quadratics using grouping or snowflake methods



**Warm Up:** Simplify each expression. Then identify  $a$ ,  $b$  and  $c$ .

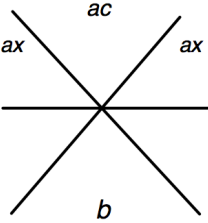
a.  $(2x - 8)^2$

b.  $(2x - 8)(2x + 8)$

c.  $(3x - 4)(2x + 5)$

**II. Factoring Quadratics of the Form  $x^2 + bx + c$**

How can we write  $x^2 + 9x + 20$  factored form? Remember this key phrase:  
*Find factors of  $ac$  that sum to  $b$*

| Grouping Method   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Factor out GCF/leading negative, if needed</li> <li>2. Find factors of <math>ac</math> that sum to <math>b</math></li> <li>3. Substitute <math>b</math> with the factors</li> <li>4. Group each half</li> <li>5. Factor each half</li> <li>6. Factor the whole</li> <li>7. Check</li> </ol> | $x^2 + 9x + 20$   |
| Snowflake Method  |   |
| <ol style="list-style-type: none"> <li>1. Factor out GCF/leading negative, if needed</li> <li>2. Find factors of <math>ac</math> that sum to <math>b</math></li> <li>3. Complete the snowflake</li> <li>4. Reduce "wings", if necessary</li> <li>5. Wings are factors</li> <li>6. Check</li> </ol>                                    | $x^2 + 9x + 20$<br><br> |

**Practice:** Factor each trinomial.

1.  $x^2 + 13x + 42$

2.  $x^2 - 10x + 21$

3.  $x^2 + 4x - 5$

4.  $-w^2 + 12w - 35$

**III. Factoring Quadratics of the Form  $ax^2 + bx + c$**

a.  $2x^2 + 11x + 12$

b.  $4x^2 - 4x - 3$

**Practice**

5.  $5x^2 - 17x + 6$

6.  $3x^2 + 10x + 8$



If the following factor to  $(ax + b)(cx + d)$ ,

7. Find  $a + b + c + d$  of  $2x^2 - 9x - 5$

8. Find  $abcd$  of  $9x^2 - 6x + 1$

**Algebra 2**  
**4-4c Special Products**

Name \_\_\_\_\_  
Date \_\_\_\_\_ A#5

**Goal:** To Factor quadratic expressions



**I. Warm Up:** Factor each expression

a.  $x^2 - 9$

b.  $4x^2 - 25$

c.  $x^2 - 12x + 36$

d.  $9x^2 + 6x + 1$

**II. Special Patterns:** Shortcuts to factor quadratics

| Difference to Two Squares   | Perfect Square Trinomial                                    |
|---|---|
| The difference of two squares factors to the product of conjugates.<br>$a^2 - b^2 = (a - b)(a + b)$ | $a^2 + 2ab + b^2 = (a + b)^2$ $a^2 - 2ab + b^2 = (a - b)^2$ |
| Ex A $x^2 - 36$   | Ex B $x^2 - 24x + 144$                                      |
| Ex C $25x^2 - 81$   | Ex D $9x^2 + 12x + 4$                                       |

**Practice:** Factor each quadratic.

1.  $4x^2 - 81$

2.  $x^2 - 20x + 100$

3.  $81x^2 - 100$

**Example E:** Factor each expression completely.

a.  $2x^2 - 50$

b.  $6x^2 + 15x - 9$

c.  $18x^2 - 24x + 8$

**Algebra 2**  
**4-4c Special Products**

**A#5**

**Practice:** Factor each expression completely.

1.  $2x^2 + 12x + 18$

2.  $4x^3 - 20x^2 + 25x$

3.  $9x^2 - 36x + 36$

4.  $25x^2 - 9$

5.  $4x^2 + 24x + 36$

6.  $16x^2 - 40x + 25$

7.  $27x^2 - 12$

8.  $4x^2 - 16$

9.  $12x^2 - 12y^2$



10. If  $9t^2 - 4 = (pt - q)(pt + q)$ , what is the value of  $p - q$  ?

11. What value of  $k$  makes  $4x^2 + kx + 81$  a perfect square trinomial?

12. What value of  $k$  makes  $25x^2 + kx + 121$  a perfect square trinomial?

**Algebra 2**  
**4-5a Quadratic Equations**

Name \_\_\_\_\_

Date \_\_\_\_\_ **A#7**



**Goal:** To solve quadratic equations by factoring.

**I. Review: Factor each quadratic polynomial**

|                            |                             |
|----------------------------|-----------------------------|
| 1. Factor $x^2 + 5x + 6$   | 2. Factor $3x^2 - 17x + 10$ |
| 3. Factor $x^2 - 13x + 42$ | 4. Factor $8x^2 - 10x - 3$  |

**II. Zero-product property**

|   |             |              |                   |
|---|-------------|--------------|-------------------|
| Let $a$ and $b$ be real numbers.<br>If $ab = 0$ , then $a = 0$ or $b = 0$ . | 6. $9x = 0$ | 7. $15a = 0$ | 8. $x(x + 2) = 0$ |
|---|-------------|--------------|-------------------|

**III. Solve the equation. Check each solution.**

|                       |                           |                            |                            |
|-----------------------|---------------------------|----------------------------|----------------------------|
| Problem               | 9. $(x + 2)(x - 3) = 0$   | 10. $(x - 5)(x + 7) = 0$   | 11. $(x - 4)(x + 3) = 0$   |
| Split and solve each. |                           |                            |                            |
| Check solutions.      |                           |                            |                            |
| Problem               | 12. $(2n + 3)(n - 4) = 0$ | 13. $(3x - 7)(2x + 1) = 0$ | 14. $(2x + 1)(3x - 4) = 0$ |
| Split and solve each. |                           |                            |                            |



**Algebra 2**  
**4-5a Quadratic Equations**

**A#7**

SAT  
Prep

|   |  |  |
|---|--|--|
| Original Problem  | 1. Find the roots of the equation. $x^2 + x - 6 = 0$                       | 2. Find the sum of the solutions to the equation. $x^2 - 6x + 5 = 0$ |
| Use snowflake to factor   |  |  |
| Use zero-product property   |  |  |
| Check solutions   |  |  |
| Original Problem  | 3. Find the $x$ -intercepts of the function related to $2x^2 - x - 21 = 0$ | 4. Find the zeros of the equation $3x^2 - 11x + 10 = 0$              |
| Use snowflake to factor   |  |  |
| Use zero-product property   |  |  |
| Check solutions   |  |  |
| Shortcut for the solutions when $a = 1$ :   |  |  |
| 5. Suppose you are building a storage box of volume $4368 \text{ in}^3$ . The length of the box will be 24 in. The height of the box will be 1 in. more than its width. Find the height and width of the box. |  |  |
| Diagram   | Formula(s)   | Work   |
|   |  |  |

**Algebra 2**  
**4-5b Solving QE by Graphing**

Name \_\_\_\_\_  
 Date \_\_\_\_\_ **A#9**

**Goal:** To solve quadratic equations by graphing or tables

**I. Warm Up:** Solve each quadratic by factoring

a.  $x^2 = 17x$

b.  $6x^2 - 13x = -6$

c.  $2x^3 - 72x = 0$

**II. Solving Quadratics by Graphing:** The solutions to quadratic equation are equivalent to the  $x$ -intercepts of the graph of the corresponding function. For example, when finding the solutions to  $x^2 = 5x - 6$ , follow these steps:

$x^2 = 5x - 6$

Original Problem

$x^2 - 5x + 6 = 0$

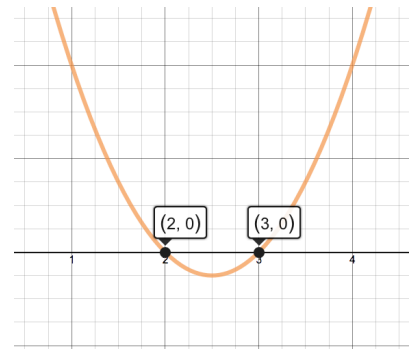
Convert to standard form

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

Graph corresponding function (set  $0 = y$ )

$x = 2, x = 3$

Estimate the  $x$ -intercepts



Check both solutions

$x^2 = 5x - 6$

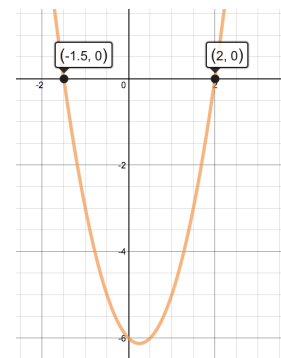
$x^2 = 5x - 6$

$( )^2 = 5( ) - 6$

$( )^2 = 5( ) - 6$

**III. Practice:** Check the solutions to the equation  $2x^2 - x - 6 = 0$  given the graph of the corresponding function.

Check



**IV. Solving Quadratics Using TI-84**

Solve the following equation using your calculator. Show all work when checking both solutions. Write some notes and show the check below.  $10x^2 = 4 - 3x$



Link to video

**V. Practice:** Solve each using a graphing calculator. Check the solutions below.

a.  $3x^2 + 2x = 2$

b.  $4x^2 - x = 6$

c.  $x^2 + 4 = 6x$

d.  $4x^2 + 3x = 6 - 2x$