Algebra 2: Foldable 4.1-4.5:

Requirements:

Standard: Equation form; what "a" tells us; Axis of Symmetry; Vertex

Vertex: Equation form; what "a" tells us; Axis of Symmetry; Vertex

Intercept: Equation form; what "a" tells us; Axis of Symmetry; Vertex; and x-intercepts.

Solve Square Roots (4.5)

Factoring Trinomials

Factoring GCF

Factoring Difference of Squares

Might want to add the following:

Simplifying Square Roots

Solving with Factoring

Algebra 2: Foldable 4.1-4.5 B:

Standard Form

Space #1

$$Y = ax^2 + bx + c$$

a>0 opens up
a<0 opens down
|a|>1 narrow
0<|a|<1 wide

Use $\frac{-b}{2a}$ to find x value of vertex.

Plug $\frac{-b}{2a}$ in for x and find y to get y value of the vertex.

(0,c) is the y -intercept.

Space #2

Vertex Form

$$Y = a(x - h)^2 + k$$

a>0 opens up
a<0 opens down
|a|>1 narrow
0<|a|<1 wide

If x-5 then h=+5
If x+5 then h=-5
h is the x value of the vertex. Tells how far the vertex moves left or right.

If +6 then k=6
If -6 then k=-6
k is the y value of the vertex. Tells how far the vertex moves up or down.

Intercept Form

Space #3

$$Y = a(x - p)(x - q)$$

a>0 opens up
a<0 opens down
|a|>1 narrow
0<|a|<1 wide

(p,0) and (q,0) are the x-intercepts.
x-value of the vertex is (p+q)/2
y-value of vertex, plug in x and find y.

Remember:
X-value of the vertex tells how far the graph moves left or right.
Y-value of the vertex tells how far the graph moves up or down.

Remember:
P and Q give you the zeros when it is in Intercept Form.

Algebra 2: Option put Space #1 thru #3 in 1 space:

Equation Name	Standard	Vertex	Intercept
Equation Form	$y = ax^2 + bx + c$	$y = a(x-h)^2 + k$	$y = a(x-p)(x-q)$ Zeros: $(p,0)$ & $(q,0)$
"a" tells what	$a > 0$ opens up (minimum) $a < 0$ opens down (maximum)	$\lvert a\rvert > 0$ narrow $\lvert a\rvert = 1$ same $0 < \lvert a\rvert < 1$ wide	
Axis of Symmetry	$x = \frac{-b}{2a}$	$x = h$	$x = \frac{p+q}{2}$
Vertex F(#) means plug # in for x and simplify to find y.	$\left(\frac{-b}{2a}, F\left(\frac{-b}{2a}\right)\right)$	(h,k)	$\left(\frac{p+q}{2}, F\left(\frac{p+q}{2}\right)\right)$

(4.5) Example 2: Solve with Square Roots. Used to find zeros when Quadratic is in Vertex Form.

Space #4

Solve: $\frac{1}{4}(y-6)^2 = 8$

$\frac{4}{1} \bullet \frac{1}{4}(y-6)^2 = 8 \bullet \frac{4}{1}$

$(y-6)^2 = 32$

Step 1: Isolate the squared term.

$\sqrt{(y-6)^2} = \pm\sqrt{32}$

$y-6 = \pm 4\sqrt{2}$

Step 2: Square root both sides.

$y - 6 = \pm 4\sqrt{2}$

$+6 \qquad +6$

$y = 6 \pm 4\sqrt{2}$

Step 3: Solve for the variable.

Solve: $(x+3)^2 = 16$

$(x+3)^2 = 16$

$\sqrt{(x+3)^2} = \pm\sqrt{16}$

$x+3 = \pm 4$

$x + 3 = \pm 4$

$-3 \quad -3$

$x = -3 \pm 4$

$x = -7, 1$

Space #5: Summary of Factoring & Difference of Squares Formula:

Summary of Factoring:

- **Step 1:** If all terms have a greatest common factor other than one, then factor it out.
- **Step 2:** If the polynomial has:
  - Two terms, then try factoring using the difference of squares formula.
  - Three terms, then try the guess and check method.
  - (Four or more terms, then try the factoring by grouping method.)

- Difference of Squares
  (only works for something squared minus something squared)
- $a^2 - b^2 = (a+b)(a-b)$

Space #6: Factor GCF:

Factoring:

GCF: The **greatest common factor** is the largest factor that divides all terms evenly.

$$15x^2y + 5xy^2 - 25x^3$$

$$GCF = 5x$$

- **Step 1:** determine the GCF and write it down. Then divide each term by the GCF.

$$5x\left(\frac{15x^2y}{5x} + \frac{5xy^2}{5x} - \frac{25x^3}{5x}\right)$$

- **Step 2:** Simplify.

Answer: $5x\left(3xy + y^2 - 5x^2\right)$

- **Step 3:** Check the result by using Distributive Property.

$$5x(3xy) + 5x\left(y^2\right) - 5x\left(5x^2\right)$$

$$15x^2y + 5xy^2 - 25x^3 \quad \surd$$

Space #7: Pick a Method (Area Method/Guess & Check Method/Table Method) Table Method shown below.

- The Table Method incorporates both the Area Method and the Guess and Check Method.

$4x^2+15x+9 \quad = (4x+3)(x+3)$

Step 1: Draw parentheses

( )( )

Step 2: Fill in the missing factors to get the first term.

(2x)(2x) or (4x)(1x)

Step 3: Fill in the missing factors to get the last term.

(2x)(2x) or (4x)(1x)

+1 +9 +1 +9

+3 +3 +3 +3

Step 4: Check by FOIL, if it doesn't work retry steps 1 and 2.

$(4x+3)(1x+3)=4x(x)+4x(3)+3(x)+3(3)=4x^2+15x+9$ ✓

Space #8: Solve by Factoring: Used to find zeros/roots when the Quadratic is in Standard From

- **Step 1:** Factor the polynomial.
- **Step 2:** Set each factor equal to zero and solve.

Example:

$$2x^2 - x - 21 = 0$$

$$(2x - 7)(x + 3) = 0$$

$$2x - 7 = 0 \qquad x + 3 = 0$$

$$+7 \quad +7 \qquad -3 \quad -3$$

$$\frac{2x}{2} = \frac{7}{2} \qquad x = -3$$

$$x = \frac{7}{2}$$

$$x = \frac{7}{2} \; or \; x = -3$$