CCGPS Analytic Geometry
Factoring Quadratics using "Lizzie Method (Star Method) "

In the previous lesson, we factored polynomials by identifying the GCF among the terms of the polynomial. Sometimes a polynomial has other factors besides a GCF that multiply to make it. Therefore, we need to learn other methods for factoring.

Follow these steps to factor a quadratic polynomial using the **Lizzie Method (Star Method)** :

1. Multiply the _____ times the _____.
2. List factor pairs for the product from step 1.
3. Find a pair of factors from step 2 that total to the _____ of the middle term.
4. Write the two factors of the polynomial as (x + ___) (x + ____) with the two factors from step 3 filling in the blanks.
5.
6. Set the factors equal to 0 to solve.

For today's lesson, all of the leading coefficients will be 1. We will add more steps to Lizzie in the next lesson when the leading coefficients are numbers other than 1.

Example: Factor $x^2 + 7x + 10$ using the steps to the Lizzie Method.

1. Multiply ***a* * *c*** : _____
2. List factor pairs of ***ac*** :
3. The pair of factors that total to ***b*** are _____.
4. The factored form of the polynomial is

   _____.
5. Solutions: _____.

Example: Factor $x^2 + 8x - 20$ using the steps to the Lizzie Method.

1. Multiply ***a* * *c*** : _____
2. List factor pairs of ***ac*** :
3. The pair of factors that total to ***b*** are _____.
4. The factored form of the polynomial is

   _____.
5. Solutions: _____.

Examples: Factor and solve each polynomial.

a. $z^2 + 11z + 24 = 0$

b. $y^2 - 14y - 15 = 0$

c. $m^2 - 7m - 30 = 0$

d. $g^2 - 9 = 0$

e. $r^2 + 12r - 45 = 0$

f. $a^2 - 14ab + 49b^2 = 0$

g. $b^2 + 16 = 0$

h. $u^2 - 100 = 0$

CCGPS Analytic Geometry

Factoring with "Lizzie Method" Practice Day 1

Solve each equation by factoring.

1) $n^2 + n - 6 = 0$

2) $b^2 - 7b + 6 = 0$

3) $x^2 - 7x = 0$

4) $k^2 - 12k + 35 = 0$

5) $n^2 - 7n + 12 = 0$

6) $p^2 - 8p + 15 = 0$

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

8) $n^2 - 7n + 10 = 0$

9) $p^2 - 4p - 32 = 0$

10) $b^2 - 4 = 0$

Tues 1/13/2015 Key

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Factoring Quadratics using "Lizzie Method (Star Method) "

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Follow these steps to factor a quadratic polynomial using the **Lizzie Method (Star Method)** :

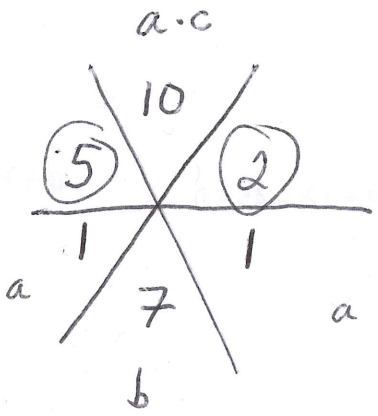
1. Multiply the _____a_____ times the _____c_____.
2. List factor pairs for the product from step 1.
3. Find a pair of factors from step 2 that total to the _____b_____ of the middle term.
4. Write the two factors of the polynomial as (x + ___) (x + ____) with the two factors from step 3 filling in the blanks.
5.
6. Set the factors equal to 0 to solve.

For today's lesson, all of the leading coefficients will be 1. We will add more steps to Lizzie in the next lesson when the leading coefficients are numbers other than 1.

$a=1$ $c=10$
$b=7$

Example: Factor $x^2 + 7x + 10$ using the steps to the Lizzie Method.

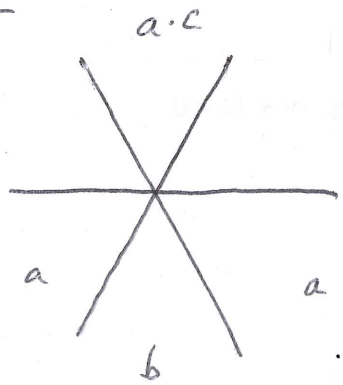
1. Multiply ***a* * *c*** : _____
2. List factor pairs of ***ac*** :
3. The pair of factors that total to ***b*** are _____.
4. The factored form of the polynomial is
   $(x+5)(x+2)=0$
5. Solutions: _____.



$x+5=0$ | $x+2=0$
$x=-5$ | $x=-2$

Example: Factor $x^2 + 8x - 20$ using the steps to the Lizzie Method.

1. Multiply ***a* * *c*** : _____
2. List factor pairs of ***ac*** :
3. The pair of factors that total to ***b*** are _____.
4. The factored form of the polynomial is
   _____.
5. Solutions: _____.

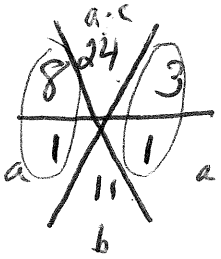


Examples: Factor and solve each polynomial.

a. $z^2 + 11z + 24 = 0$

GCF: 1

$a = 1$
$b = 11$
$c = 24$



$8 \times 3 = 24$ ✓

$8 + 3 = 11$ ✓

$(x + 8)(x + 3) = 0$

$x + 8 = 0$ | $x + 3 = 0$

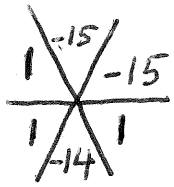
$-8 \quad -8$ | $-3 \quad -3$

$x = -8$ | $x = -3$

b. $y^2 - 14y - 15 = 0$

$a = 1$
$b = -14$
$c = -15$

GCF: 1



$\frac{1}{1} \times \frac{-15}{} = -15$ ✓

$\frac{1}{1} + \frac{-15}{} = -14$ ✓

$(x - 15)(x + 1)$ factored form

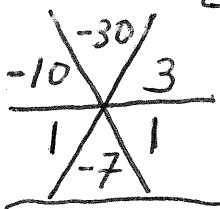
$(x - 15 = 0 \quad x + 1 = 0$ solution

$x = 15, \; x = -1$

c. $m^2 - 7m - 30 = 0$

GCF: 1

$a = 1$
$b = -7$
$c = -30$



$-10 \times 3 = -30$ ✓

$-10 + 3 = -7$ ✓

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

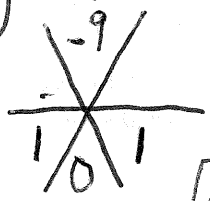
$x = 10, -3$

d. $g^2 - 9 = 0$

$g^2 + 0g - 9$

GCF: 1

$a = 1$
$b = 0$
$c = -9$



$3 \times -3 = -9$

$3 + -3 = 0$

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

$x = 3, x = -3$

e. $r^2 + 12r - 45 = 0$

$(r - 3)(r + 15)$

$r = 3, \; r = -15$

***f.** $a^2 - 14ab + 49b^2 = 0$

$(a - 7b)(a - 7b)$ *

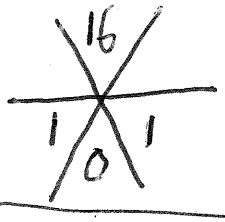
$a = 7b, \; a = -7b$

g. $b^2 + 16 = 0$

GCF: 1

$b^2 + 0b + 16$

$a = 1$
$b = 0$
$c = 16$



$\_\_ \times \_\_ = 16$

$\_\_ + \_\_ = 0$

Not factorable
prime

h. $u^2 - 100 = 0$

$(u - 10)(u + 10)$

$u = 10, -10$

CCGPS Analytic Geometry

Factoring with "Lizzie Method" Practice Day 1

Solve each equation by factoring.

1) $n^2 + n - 6 = 0$

$\{-3, 2\}$

2) $b^2 - 7b + 6 = 0$

$\{1, 6\}$

a b c

$a \cdot c$

-1 6 -6 1 1 -7 b

$(b - \frac{1}{1})(b - \frac{6}{1}) = 0$

$(b-1)(b-6) = 0$

$b = 1, \; b = 6$

3) $x^2 - 7x = 0$

$\{7, 0\}$

4) $k^2 - 12k + 35 = 0$

$\{5, 7\}$

5) $n^2 - 7n + 12 = 0$

$\{4, 3\}$

6) $p^2 - 8p + 15 = 0$

$\{3, 5\}$

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

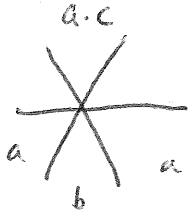
$\{-6, 1\}$

8) $n^2 - 7n + 10 = 0$

$\{2, 5\}$

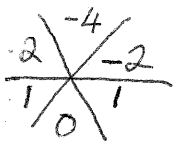
9) $p^2 - 4p - 32 = 0$

$\{8, -4\}$



10) $b^2 - 4 = 0$

$\{-2, 2\}$



$b^2 + 0x - 4 = 0$

$(b+2)(b-2) = 0$