GRADE ALG

ALIGNED TO THE CORE LESSON

Factor Polynomials of the Form ax^2+bx+c Where $a=1$

By DataWORKS Educational Research

Learning Objective

We will factor polynomials of the form ax^2+bx+c where $a=1$.

*Prerequisite: Algebra I 10.0 add, subtract, multiply, divide polynomials.

CFU

What are we going to learn?

Activate Prior Knowledge

A **binomial** is a polynomial with **exactly two** terms.
A **trinomial** is a polynomial with **exactly three** terms.

Multiply the following binomials.

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

$x^2+5x-2x-10$

$x^2+\underbrace{3}_{-2+5}x\underbrace{-10}_{-2\bullet 5}$

Notice that the constant term in the trinomial is the product of -2 & 5 AND the 2nd coefficient is the sum of -2 & 5.

Student. $(x+3)(x+5) = x^2+8x+15$

$x^2+5x+3x+15$

$x^2+\underbrace{8}_{3+5}x+\underbrace{15}_{3\bullet 5}$

Notice that the constant term in the trinomial is the product of 3 & 5 AND the 2nd coefficient is the sum of 3 & 5.

Binomial $x+3$

Trinomial $2x^2+8x+15$

leading coefficient; 2nd coefficient; constant term

Make Connection

Students, you already know how to multiply polynomials. Now, we will work backwards and factor polynomials.

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READY TO TEACH℠ EDI® Lessons

Concept Development

To **factor a polynomial** means to represent a polynomial as a **multiplication** of **polynomials**.

- *Factoring a polynomial is the reverse[1] of multiplying polynomials.*
- *The polynomial* $a x^2 + b x + c$ *factors into the product of two binomial factors.*

Factoring $ax^2 + bx + c$

multiplies to

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

factors to

Factoring the Polynomial $ax^2 + bx + c$ where $a = 1$.

$1x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

$x^2 + 8x + 15$ factors to $(x + 3)(x + 5)$

Factor pairs of 15
1 and 15
-1 and -15
3 and 5
-3 and -5

✔ *Check*

$(x + 3)(x + 5)$

$x^2 + 5x + 3x + 15$

$x^2 + 8x + 15$

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Show the following trinomial factored: $x^2 + 10x + 21$? How do you know?

A $x^2 + 10x + 21 = x^2 + 5x + 5x + 21$

B $x^2 + 10x + 21 = (x + 3)(x + 7)$

After factoring a polynomial, explain how you would check your work.

Use the factor pairs of 15 to explain why you cannot factor the following trinomial: $x^2 + 9x + 15$

Not an example of a polynomial that can be factored:

Some polynomials cannot be factored.

$x^2 + 5x + 15$

The trinomial above cannot be factored since none of the factor pairs of 15 have a sum of 5

Factor pairs of 15
1 and 15
-1 and -15
3 and 5
-3 and -5

Vocabulary

[1] opposite (synonym)

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify[2] a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   - a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

CFU

1. How did I/you identify a, b, and c in the polynomial?
- 3a. How did I/you know whether the polynomial can or cannot be factored?
4. How did I/you factor the polynomial using the correct factor pair?
5. How did I/you check and interpret the factorization?

1.) $m^2 - 11m + 18 = (m - 2)(m - 9)$

a = 1 b = −11 c = 18

Check

$(m - 2)(m - 9)$

$m^2 - 9m - 2m + 18$

$m^2 - 11m + 18$ ✓

Factor pairs of 18

1 and 18
-1 and -18
2 and 9
-2 and -9
3 and 6
-3 and -6

2.) $n^2 + 5n + 6 = (n + 2)(n + 3)$

a = 1 b = 5 c = 6

Check

$(n + 2)(n + 3)$

$n^2 + 3n + 2n + 6$

$n^2 + 5n + 6$ ✓

Factor pairs of 6

1 and 6
-1 and -6
2 and 3
-2 and -3

Vocabulary

[2] find

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring 1 $x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
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CFU

1. How did I/you identify a, b, and c in the polynomial?
- 3a. How did I/you know whether the polynomial can or cannot be factored?
4. How did I/you factor the polynomial using the correct factor pair?
5. How did I/you check and interpret the factorization?

3.) $w^2 + w - 6 = (w - 2)(w + 3)$

a = 1 b = 1 c = –6

Check

$(w - 2)(w + 3)$

$w^2 + 3w - 2w - 6$

$w^2 + w - 6$ ✓

Factor pairs of -6

1 and -6
-1 and 6
2 and -3
-2 and 3

4.) $n^2 + n - 12 = (n - 3)(n + 4)$

a = 1 b = 1 c = –12

Check

$(n - 3)(n + 4)$

$n^2 + 4n - 3n - 12$

$n^2 + n - 12$ ✓

Factor pairs -12

1 and -12
-1 and 12
2 and -6
-2 and 6
3 and -4
-3 and 4

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To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
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4. Factor the polynomial using the correct factor pair.
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CFU

1. How did I/you identify a, b, and c in the polynomial?
- 3a. How did I/you know whether the polynomial can or cannot be factored?
4. How did I/you factor the polynomial using the correct factor pair?
5. How did I/you check and interpret the factorization?

5.) $k^2 + 5k - 8$ *Cannot be factored since none of the factor pairs of -8 add to 5.*

a = 1 b = 5 c = −8

Check

Factor pairs of -8

1 + (-8) = -7	1 and -8
-1 + 8 = 7	-1 and 8
2 + (-4) = -2	2 and -4
-2 + 4 = 2	-2 and 4

6.) $n^2 + 6n + 10$ *Cannot be factored since none of the factor pairs of 10 add to 6.*

a = 1 b = 6 c = 10

Check

Factor pairs of 10

1 + 10 = 11	1 and 10
(-1) + (-10) = -11	-1 and -10
2 + 5 = 7	2 and 5
(-2) + (-5) = -7	-2 and -5

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   - a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

CFU

1. How did I/you identify a, b, and c in the polynomial?
- 3a. How did I/you know whether the polynomial can or cannot be factored?
4. How did I/you factor the polynomial using the correct factor pair?
5. How did I/you check and interpret the factorization?

7.) $m^2 - 25 = (m + 5)(m - 5)$

a = 1 b = 0 c = −25

Check

$(m + 5)(m - 5)$

$m^2 - 5m + 5m - 25$

$m^2 - 25$ ✓

Factor pairs of -25

1 and -25
-1 and 25
5 and -5

8.) $y^2 - 9 = (y + 3)(y - 3)$

a = 1 b = 0 c = −9

Check

$(y + 3)(y - 3)$

$y^2 - 3y + 3y - 9$

$y^2 - 9$ ✓

Factor pairs of -9

1 and -9
-1 and 9
3 and -3

To factor a polynomial means to represent a polynomial as a **multiplication** of **polynomials**.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

1 *Factoring polynomials will help you solve quadratic equations.*

Solve the following quadratic equation.

$$x^2 + 9x + 20 = 0$$

$$(x + 4)(x + 5) = 0$$

$$x + 4 = 0 \qquad x + 5 = 0$$

$$-4 \quad -4 \qquad -5 \quad -5$$

$$x = -4 \qquad x = -5$$

2 *Factoring polynomials will help you do well on tests.*

Sample Test Question:

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

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

CFU

Does anyone else have another reason why it is relevant to factor polynomials? (Pair-Share) Why is it relevant to factor polynomials? You may give one of my reasons or one of your own. Which reason is more relevant to you? Why?

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \cdot 5$

Skill Closure

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

1.) $x^2 + 9x + 8 = (x + 1)(x + 8)$

a = 1 b = 9 c = 8

Check

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

$x^2 + 8x + 1x + 8$

$x^2 + 9x + 8$ ✓

Factor pairs of 8

- 1 and 8
- -1 and -8
- 2 and 4
- -2 and -4

2.) $y^2 + 2y - 8 = (y - 2)(y + 4)$

a = 1 b = 2 c = −8

Check

$(y - 2)(y + 4)$

$y^2 + 4y - 2y - 8$

$y^2 + 2y - 8$ ✓

Factor pairs -8

- 1 and -8
- -1 and 8
- 2 and -4
- -2 and 4

Constructed Response Closure

Jen is factoring the polynomial $x^2 + 15x + 14$. Her work is shown to the right. Given the work she has done so far, which of the following is a factor of $x^2 + 15x + 14$? How do you know?

A $x - 2$ B $x + 14$ C $x - 7$ D $x + 7$

Jen's work

$x^2 + 15x + 14$

a = 1 b = 15 c = 14

List of factors: 14

1	14
2	7
-1	-14
-2	-7

Summary Closure

What did you learn today about factoring polynomials of the form $ax^2 + bx + c$ where a=1? (Pair-Share)

Independent Practice

To factor a polynomial means to represent a polynomial as a multiplication of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

1.) $x^2 + 6x + 9 = (x + 3)(x + 3) = (x + 3)^2$

a = 1 b = 6 c = 9

Check

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

$x^2 + 3x + 3x + 9$

$x^2 + 6x + 9$ ✓

Factor pairs of 9

1 and 9
-1 and -9
3 and 3
-3 and -3

2.) $m^2 - 8m + 12 = (m - 2)(m - 6)$

a = 1 b = −8 c = 12

Check

$(m - 2)(m - 6)$

$m^2 - 6m - 2m + 12$

$m^2 - 8m + 12$ ✓

Factor pairs of 12

1 and 12
-1 and -12
2 and 6
-2 and -6
3 and 4
-3 and -4

3.) $m^2 - 5m - 6 = (m + 1)(m - 6)$

a = 1 b = −5 c = −6

Check

$(m + 1)(m - 6)$

$m^2 - 6m + 1m - 6$

$m^2 - 5m - 6$ ✓

Factor pairs of -6

1 and -6
-1 and 6
2 and -3
-2 and 3

4.) $n^2 + 8n - 9 = (n - 1)(n + 9)$

a = 1 b = 8 c = −9

Check

$(n - 1)(n + 9)$

$n^2 + 9n - n - 9$

$n^2 + 8n - 9$ ✓

Factor pairs -9

1 and -9
-1 and 9
3 and -3

Independent Practice (continued)

To factor a polynomial means to represent a polynomial as a multiplication of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify a, b, and c in the polynomial and verify that a = 1.
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3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

5.) $k^2 + 10k - 14$ *Cannot be factored since none of the factor pairs of -14 add to 10.*

a = 1 b = 10 c = −14

Check

Factor pairs of -14
1 and -14
-1 and 14
2 and -7
-2 and 7

$1 + (-14) = -13$
$-1 + 14 = 13$
$2 + (-7) = -5$
$-2 + 7 = 5$

6.) $n^2 + 9n + 21$ *Cannot be factored since none of the factor pairs of 21 add to 9.*

a = 1 b = 9 c = 21

Check

Factor pairs 21
1 and 21
-1 and -21
3 and 7
-3 and -7

$1 + 21 = 22$
$(-1) + (-21) = -22$
$3 + 7 = 10$
$(-3) + (-7) = -10$

7.) $m^2 - 4 = (m + 2)(m - 2)$

a = 1 b = 0 c = −4

Check

$(m + 2)(m - 2)$

$m^2 - 2m + 2m - 4$

$m^2 - 4$ ✓

Factor pairs of -4
1 and -4
-1 and 4
2 and -2

8.) $y^2 - 49 = (y + 7)(y - 7)$

a = 1 b = 0 c = −49

Check

$(y + 7)(y - 7)$

$y^2 - 7y + 7y - 49$

$y^2 - 49$ ✓

Factor pairs of -49
1 and -49
-1 and 49
7 and -7

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

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Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify a, b, and c in the polynomial and verify that a = 1.
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3. Identify the factor pair of c whose sum is equal to b.
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4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \bullet 5$

1.) $x^2 - 10x + 25 = (x - 5)(x - 5) = (x - 5)^2$

a = 1 b = −10 c = 25

Check

$(x - 5)(x - 5)$

$x^2 - 5x - 5x + 25$

$x^2 - 10x + 25$ ✓

Factor pairs of 25

1 and 25
-1 and -25
5 and 5
-5 and -5

2.) $n^2 + 9n - 22 = (n - 2)(n + 11)$

a = 1 b = 9 c = −22

Check

$(n - 2)(n + 11)$

$n^2 + 11n - 2n - 22$

$n^2 + 9n - 22$ ✓

Factor pairs of -22

1 and -22
-1 and 22
2 and -11
-2 and 11

3.) $m^2 - 1 = (m + 1)(m - 1)$

a = 1 b = 0 c = −1

Check

$(m + 1)(m - 1)$

$m^2 - m + m - 1$

$m^2 - 1$ ✓

Factor pairs of -1

1 and -1

4.) $p^2 - 6p - 27 = (p + 3)(p - 9)$

a = 1 b = −6 c = −27

Check

$(p + 3)(p - 9)$

$p^2 - 9p + 3p - 27$

$p^2 - 6p - 27$ ✓

Factor pairs of -27

1 and -27
-1 and 27
3 and -9
-3 and 9

To factor a polynomial means to represent a polynomial as a multiplication of polynomials.

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Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify a, b, and c in the polynomial and verify that a = 1.
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Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \cdot 5$

5.) $m^2 + 5m - 12$ *Cannot be factored since none of the factor pairs of -12 add to 5.*

a = 1 b = 5 c = −12

Check

Factor pairs of -12

1 and -12
-1 and 12
2 and -6
-2 and 6
3 and -4
-3 and 4

6.) $y^2 - 10y + 9 = (y - 1)(y - 9)$

a = 1 b = −10 c = 9

Check

$(y - 1)(y - 9)$

$y^2 - 9y - y + 9$

$y^2 - 10y + 9$ ✓

Factor pairs 9

1 and 9
-1 and -9
3 and 3
-3 and -3

7.) $w^2 + 5w - 6 = (w - 1)(w + 6)$

a = 1 b = 5 c = −6

Check

$(w - 1)(w + 6)$

$w^2 + 6w - w - 6$

$w^2 + 5w - 6$ ✓

Factor pairs of -6

1 and -6
-1 and 6
2 and -3
-2 and 3

8.) $n^2 - n - 20 = (n + 4)(n - 5)$

a = 1 b = −1 c = −20

Check

$(n + 4)(n - 5)$

$n^2 - 5n + 4n - 20$

$n^2 - n - 20$ ✓

Factor pairs of -20

1 and -20
-1 and 20
2 and -10
-2 and 10
4 and -5
-4 and 5

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

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Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

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Factor polynomials of the form $ax^2 + bx + c$ where a=1.

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3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

1.) $k^2 + 13k - 30 = (k - 2)(k + 15)$

a = 1 b = 13 c = −30

Check

$(k - 2)(k + 15)$

$k^2 + 15k - 2k - 30$

$k^2 + 13k - 30$ ✓

Factor pairs of -30

1 and -30
-1 and 30
2 and -15
-2 and 15
3 and -10
-3 and 10
5 and -6
-5 and 6

2.) $n^2 - 12n + 36 = (n - 6)(n - 6) = (n - 6)^2$

a = 1 b = −12 c = 36

Check

$(n - 6)(n - 6)$

$n^2 - 6n - 6n + 36$

$n^2 - 12n + 36$ ✓

Factor pairs of 36

1 and 36 | -1 and -36
2 and 18 | -2 and -18
3 and 12 | -3 and -12
6 and 6 | **-6 and -6**

3.) $m^2 - 14m - 32 = (m + 2)(m - 16)$

a = 1 b = −14 c = −32

Check

$(m + 2)(m - 16)$

$m^2 - 16m + 2m - 32$

$m^2 - 14m - 32$ ✓

Factor pairs of -32

1 and -32
-1 and 32
2 and -16
-2 and 16
4 and -8
-4 and 8

4.) $x^2 - 4x + 6$ *Cannot be factored since none of the factor pairs of 6 add to -4.*

a = 1 b = −4 c = 6

Check

Factor pairs of 6

1 and 6
-1 and -6
2 and 3
-2 and -3

To factor a polynomial means to represent a polynomial as a multiplication of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \cdot 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
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   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

5.) $n^2 + n - 6 = (n - 2)(n + 3)$

a = 1 b = 1 c = −6

Check

$(n - 2)(n + 3)$

$n^2 + 3n - 2n - 6$

$n^2 + n - 6$ ✓

Factor pairs of -6

1 and -6
-1 and 6
2 and -3
-2 and 3

6.) $p^2 + 2p - 8 = (p - 2)(p + 4)$

a = 1 b = 2 c = −8

Check

$(p - 2)(p + 4)$

$p^2 + 4p - 2p - 8$

$p^2 + 2p - 8$ ✓

Factor pairs -8

1 and -8
-1 and 8
2 and -4
-2 and 4

7.) $m^2 - 7m - 18 = (m + 2)(m - 9)$

a = 1 b = −7 c = −18

Check

$(m + 2)(m - 9)$

$m^2 - 9m + 2m - 18$

$m^2 - 7m - 18$ ✓

Factor pairs of -18

1 and -18
-1 and 18
2 and -9
-2 and 9
3 and -6
-3 and 6

8.) $m^2 - 16 = (m + 4)(m - 4)$

a = 1 b = 0 c = −16

Check

$(m + 4)(m - 4)$

$m^2 - 4m + 4m - 16$

$m^2 - 16$ ✓

Factor pairs of -16

1 and -16
-1 and 16
2 and -8
-2 and 8
4 and -4

To factor a polynomial means to represent a polynomial as a **multiplication** of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \cdot 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

1.) $x^2 - 5xy + 6y^2 = (x - 2y)(x - 3y)$

a = 1 b = −5 c = 6

Check

$(x - 2y)(x - 3y)$

$x^2 - 3xy - 2xy + 6y^2$

$x^2 - 5xy + 6y^2$ ✓

Factor pairs of 6

1 and 6
-1 and -6
2 and 3
[-2 and -3]

2.) $x^2 + 4xy - 5y^2 = (x - y)(x + 5y)$

a = 1 b = 4 c = −5

Check

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

$x^2 + 5xy - xy - 5y^2$

$x^2 + 4xy - 5y^2$ ✓

Factor pairs of -5

1 and -5
[-1 and 5]

3.) $m^2 + 18m + 56 = (m + 4)(m + 14)$

a = 1 b = 18 c = 56

Check

$(m + 4)(m + 14)$

$m^2 + 14m + 4m + 56$

$m^2 + 18m + 56$ ✓

Factor pairs of 56

1 and 56	-1 and -56
2 and 28	-2 and -28
[4 and 14]	-4 and -14
7 and 8	-7 and -8

4.) $x^2 + 4x - 5 = (x - 1)(x + 5)$

a = 1 b = 4 c = −5

Check

$(x - 1)(x + 5)$

$x^2 + 5x - x - 5$

$x^2 + 4x - 5$ ✓

Factor pairs of -5

1 and -5
[-1 and 5]

To factor a polynomial means to represent a polynomial as a multiplication of polynomials.

- *Factoring a polynomial is the reverse of multiplying polynomials.*

Factoring $1x^2 + bx + c$

$x^2 + 8x + 15 = (x + 3)(x + 5)$

$3 + 5 \quad 3 \cdot 5$

Factor polynomials of the form $ax^2 + bx + c$ where a=1.

1. Identify$_2$ a, b, and c in the polynomial and verify that a = 1.
2. List all the factor pairs for c.
3. Identify the factor pair of c whose sum is equal to b.
   a. If none, then the polynomial cannot be factored.
4. Factor the polynomial using the correct factor pair.
5. Check and interpret the factorization. "_____ *factors to* _____"

5.) $y^2 - 4y - 32 = (y + 4)(y - 8)$

a = 1 b = −4 c = −32

Check

$(y + 4)(y - 8)$

$y^2 - 8y + 4y - 32$

$y^2 - 4y - 32$ ✓

Factor pairs of -32

1 and -32
-1 and 32
2 and -16
-2 and 16
4 and -8
-4 and 8

6.) $n^2 + 10n - 24 = (n - 2)(n + 12)$

a = 1 b = 10 c = −24

Check

$(n - 2)(n + 12)$

$n^2 + 12n - 2n - 24$

$n^2 + 10n - 24$ ✓

Factor pairs of -24

1 and -24
-1 and 24
2 and -12
-2 and 12
3 and -8
-3 and 8
4 and -6
-4 and 6

7.) $m^2 + 12m + 56$ *Cannot be factored since none of the factor pairs of 56 add to 12.*

a = 1 b = 12 c = 56

Check

Factor pairs of 56

1 and 56
-1 and -56
2 and 28
-2 and -28
4 and 14
-4 and -14
7 and 8
-7 and -8

8.) $w^2 - 36 = (w + 6)(w - 6)$

a = 1 b = 0 c = −36

Check

$(w + 6)(w - 6)$

$w^2 - 6w + 6w - 36$

$w^2 - 36$ ✓

Factor pairs of -36

1 and -36
-1 and 36
2 and -18
-2 and 18
3 and -12
-3 and 12
4 and -9
-4 and 9
6 and -6

EDI – Cognitive, Teaching, and English Learner Strategies

Learning Objective: We will factor a polynomial of the form ax2+bx+c where a = 1.

Cognitive Strategies

Elaboration	

Teaching Strategies

Demonstration	

Language Strategies

Targeted Vocabulary	Academic	reverse, identify
	Content	
	Support	
Vocabulary Strategy	Multiple-Meaning	
	Synonym	reverse, identify
	Definition	
	Homophone	
	Internal Context Clue	
Listen, Speak	Similar Sounds	
Read	Tracked Reading	
Write	Writing	

Content Access Strategies

Comprehensible Input	Cognates	
Contextual Clues	Graphic Organizer	
	Contextualized Definitions	
	Pictures	

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