(HMH) Algebra 1 week 1   Factor & Solve

$$x^2 + bx + c = 0$$

Example:

FACTOR $x^2 + 5x + 6$

x^2	$3x$
$2x$	$+6$

x
$+$
2

$x + 1$

$$\boxed{(x+1)(x+2) \text{ or } (x+2)(x+1)}$$

$+6$	$+5$
$1 \cdot 6$	$1 + 6 = 7$ NO
$2 \cdot 3$	$2 + 3 = 5$ Yes ✓

- - - - - - - - - - - - - - - - - -

Example:

Solve: $x^2 + 5x + 6 = 0$

$$(x+1)(x+2) = 0$$

just factor,
Set each
Factor $= 0$,
Solve:

$$x + 1 = 0 \qquad x + 2 = 0$$
$$\underline{-1 \; -1} \qquad \underline{-2 \; -2}$$
$$\boxed{x = -1} \qquad \boxed{x = -2}$$

WS 125 "Look at bottom of page"
1-7 all   use paper for more room

LESSON 21-1

Solving Equations by Factoring $x^2 + bx + c$

Reteach

To find the factors for a trinomial in the form $x^2 + bx + c$, answer these 2 questions.

1. What numbers have a product equal to c?

2. What numbers have a sum equal to b?

Find numbers for which the answer to both is yes.

Factor $x^2 + 5x + 6$.

What numbers have a product equal to c, 6?

| 1 and 6 | −1 and −6 | 2 and 3 | −2 and −3 |

What numbers have a sum equal to b, 5?

| 1 and 6 | −1 and −6 | (2 and 3) | −2 and −3 |

The factors of $x^2 + 5x + 6$ are $(x + 2)$ and $(x + 3)$.

Solve the trinomial by setting it equal to 0. Factor and use the Zero Product Property to solve.

Example
Solve $x^2 + 5x + 6 = 0$.
$x^2 + 5x + 6 = 0$

$(x + 2)(x + 3) = 0$	*Factor $x^2 + 5x + 6$.*
$x + 2 = 0$ or $x + 3 = 0$	*Set each factor equal to 0.*
$x = -2$ or $x = -3$	*Solve each equation for x.*

Complete the factoring.

1. $x^2 + x - 2$

What numbers have a product equal to c, _____?

_____

What numbers have a sum equal to b, _____?

_____

Factors: _____

Factor.

2. $x^2 + 4x + 4$ 3. $x^2 - 4x + 3$ 4. $x^2 + 3x - 10$

_____   _____   _____

Solve.

5. $x^2 + 12x + 35 = 0$ 6. $x^2 - 9x + 18 = 0$ 7. $x^2 - x - 20 = 0$

_____   _____   _____

HMH Algebra 1   Factor $x^2 + bx + c = 0$
   Week 1 $\overset{\&}{Solve}$

WS 361:   (12) $x^2 = 5x$
                                      } always get EQ = 0
                  $\underline{-5x \quad -5x}$ First...

                  $\dfrac{x^2 - 5x}{x} \dfrac{}{x} = 0$

                                   Factor out common
                                        Factor

                  $x(x-5) = 0$

                                   Set each Factor
                                   = 0, Solve
            $x = 0 \quad x - 5 = 0$
                      $\underline{+5 \quad +5}$

            $\boxed{X = 0} \quad \boxed{X = 5}$

- -

WS 361   (17) $x^2 = -2x + 15$

                 $+2x \qquad +2x \quad -15$
                 $\underline{-15}$ Get EQ = 0
                                          put in Standard
                 $x^2 + 2x - 15 = 0$ Form:
                                          $ax^2 + bx + c = 0$

                 $\begin{array}{c|c} -15 & \overset{+}{2} \\ \hline 5 \cdot ^-3 & 5 + ^-3 = 2 \checkmark \end{array}$

            | x^2 | $-3x$ | x
            |-------|-------|
            | $5x$ | -15 | $\overset{+}{5}$
                 x -3

                                    $(x+5)(x-3) = 0$

                                    $x + 5 = 0 \quad x - 3 = 0$
                                    $\underline{-5 \; -5} \quad \underline{+3 \; +3}$
                                    $\boxed{X = -5} \quad \boxed{X = 3}$

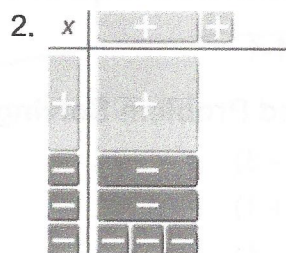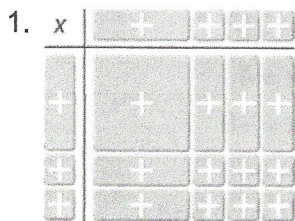 $\boxed{\text{WS 361   3-17 all   use your own paper}}$
                      for Space

LESSON 21-1

Solving Equations by Factoring $x^2 + bx + c$
Practice and Problem Solving: A/B

What factors are shown by the algebra tiles?

1.

   _____

2.

   _____

Factor.

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

   _____

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

   _____

5. $x^2 - 14x + 45$

   _____

6. $x^2 + 11x + 24$

   _____

7. $x^2 - 12x + 32$

   _____

8. $x^2 - 15x + 36$

   _____

9. $x^2 - 11x - 42$

   _____

10. $x^2 - 18x + 81$

    _____

11. $x^2 - 7x - 44$

    _____

Solve by factoring.

12. $x^2 = 5x$

    _____

13. $x^2 = 9x - 18$

    _____

14. $x^2 - 15x + 50 = 0$

    _____

15. $x^2 = -4x + 21$

    _____

16. $x^2 + 7x = 8$

    _____

17. $x^2 = -2x + 15$

    _____

Solve.

18. The product of two consecutive integers is 72. Find all solutions.

    _____

19. The length of a rectangle is 8 feet more than its width. The area of the rectangle is 84 square feet. Find its length and width.

    _____

HMH Algebra 1:   Factor & Solve
    Week 1 $x^2 + bx + c = 0$

Example:
ws 362 ④ $x^2 - 25 = 0$

$(x-5)(x+5) = 0$ $\begin{cases} \text{Factor difference} \\ \text{of 2 squares} \\ a^2 - b^2 = (a-b)(a+b) \end{cases}$

$x - 5 = 0 \quad x + 5 = 0$
$\underline{+5 \quad +5} \quad \underline{-5 \quad -5}$
$\boxed{x = 5} \quad \boxed{x = -5}$

- -

Example:
ws 362 ⑦ $x^2 \boxed{-9} + 2x \boxed{+1} = 0$ Combine Like terms
             $x^2 + 2x - 8 = 0$

x^2	$-2x$	x
$4x$	-8	$+4$

$x \quad -1$

$\begin{array}{c|c} -8 & +2 \\ \hline 4 \cdot -2 & 4 + -2 = 2 ✓ \end{array}$

$(x-1)(x+4) = 0$
$x - 1 = 0 \quad x + 4 = 0$
$\underline{+1 \quad +1} \quad \underline{-4 \quad -4}$
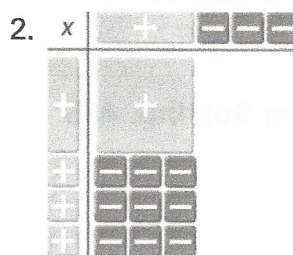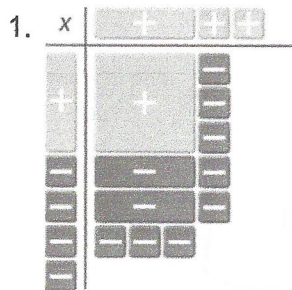$\boxed{x = 1} \quad \boxed{x = -4}$

ws 362   4-15 all   use your own paper

LESSON 21-1

Solving Equations by Factoring $x^2 + bx + c$

Practice and Problem Solving: C

What polynomials are shown by the algebra tiles?

1.

_____

2.

_____

3. A trinomial is in the form $x^2 + bx + c$, where $b < 0$ and $c > 0$. What do you know about the two factors?

_____

Solve by factoring.

4. $x^2 - 25 = 0$

_____

5. $x^2 - 2x + 1 = 0$

_____

6. $x^2 - 5x + 4 = 0$

_____

7. $x^2 - 9 + 2x + 1 = 0$

_____

8. $x^2 + x = 30$

_____

9. $x^2 = 36$

_____

10. $x + 3 = x^2 - 3$

_____

11. $x^2 + 3x - 11 = 43$

_____

12. $x^2 - 3x = 40$

_____

13. $x^2 = -3x + 28$

_____

14. $x^2 + 8x = -63 - 8x$

_____

15. $x^2 - 20 = x$

_____

Solve.

16. The product of two consecutive integers is five less than five times their sum. Find all possible solutions.

_____

17. The sum of the first n positive integers can be found using the formula $\frac{n(n + 1)}{2}$. How many integers must be added to get 253 as the sum?

_____

(HMH) Algebra 1 week 1   Factor & Solve
$$x^2 + bx + c = 0$$

This is a workday!

WS 363 3-17 all use your own paper

LESSON 21-1

Solving Equations by Factoring $x^2 + bx + c$

Practice and Problem Solving: Modified

Complete the table to find the correct factors. The first one is started for you.

1. $x^2 + 8x + 15$

factors of 15	sum of factors
3, 5	8
−3, −5	−8
1, 15	16
−1, −15	−16

factors: _____

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

factors of 6	sum of factors

factors: _____

Factor each trinomial. The first one is done for you.

3. $x^2 + x - 2$

    ___$(x + 2)(x - 1)$___

4. $x^2 + x - 6$

    _____

5. $x^2 + 2x + 1$

    _____

6. $x^2 - x - 12$

    _____

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

    _____

8. $x^2 + 6x + 9$

    _____

9. $x^2 - x - 6$

    _____

10. $x^2 - 8x + 15$

    _____

11. $x^2 + 7x + 12$

    _____

Solve each equation by factoring. The first one is done for you.

12. $x^2 - 3x + 2 = 0$

    _____$x = 1, 2$_____

13. $x^2 + 2x - 3 = 0$

    _____

14. $x^2 + 6x + 8 = 0$

    _____

15. $x^2 + 10x + 25 = 0$

    _____

16. $x^2 + 10x + 21 = 0$

    _____

17. $x^2 - 11x + 24 = 0$

    _____

Write and solve an equation for each problem. The first one is started for you.

18. The product of two consecutive positive integers is 30. Find the integers.

    ___$x(x + 1) = x^2 + x;\ x^2 + x = 30;\ x^2 + x - 30 = 0$___

19. The product of two consecutive positive integers is 110. Find the integers.

    _____