

Standard(s)

MGSE9–12.A.SSE.3a Factor any quadratic expression to reveal the zeros of the function defined by the expression.

Day 2 – Factor Trinomials when a = 1

Standard(s): _____



What do you already know about the standards?

Factoring Trinomials when a = 1

$$x^2 + bx + c$$

Preview Skill for Lesson



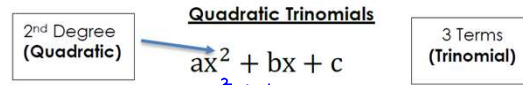
Diamond Math Problems

Name: _____ Date: _____

Complete the diamond problems. The top cell contains the *product* of the numbers in the left and right cells, while the bottom cell contains the *sum*.

(1) $\begin{array}{c} \text{product} \\ -10 \\ -2 \quad +5 \\ 3 \\ \text{Sum} \end{array}$	(2) $\begin{array}{c} \text{product} \\ -10 \\ -1 \quad 10 \\ 9 \\ \text{Sum} \end{array}$	(3) $\begin{array}{c} 12 \\ 3 \quad 4 \\ 7 \end{array}$	(4) $\begin{array}{c} x \\ 6 \\ +1 \quad +6 \\ 7 \\ \text{add} \end{array}$	$\frac{6}{16}$ $\frac{2}{3}$
(5) $\begin{array}{c} 63 \\ +7 \quad +9 \\ 16 \end{array}$	(6) $\begin{array}{c} -63 \\ -7 \quad +9 \\ 2 \end{array}$	(7) $\begin{array}{c} -56 \\ +7 \quad -8 \\ -1 \end{array}$	(8) $\begin{array}{c} 12 \\ +3 \quad +4 \\ 7 \end{array}$	
(9) $\begin{array}{c} 21 \\ +3 \quad +7 \\ 10 \end{array}$	(10) $\begin{array}{c} -30 \\ -5 \quad +6 \\ 1 \end{array}$	(11) $\begin{array}{c} 70 \\ +7 \quad +10 \\ 17 \end{array}$	(12) $\begin{array}{c} 60 \\ +6 \quad +10 \\ 16 \end{array}$	

Quadratic Trinomials



Factoring a trinomial means finding two binomials that when multiplied together produce the given trinomial.

$$(\quad)(\quad)$$

Looking for Patterns

What do you observe in the following Area Models?

	3x	+4
x	<u>3x²</u>	<u>+4x</u>
-3	<u>-9x</u>	<u>-12</u>

Multiply

$$(x-3)(3x+4) = \underline{3x^2} - \underline{5x} - \underline{12}$$

Factor

	4x	+3
2x	<u>8x²</u>	<u>+6x</u>
+1	<u>+4x</u>	<u>+3</u>

$$(2x+1)(4x+3) = \underline{8x^2} + \underline{10x} + \underline{3}$$

Factor: $x^2 - 4x - 32 = (\quad) (\quad)$

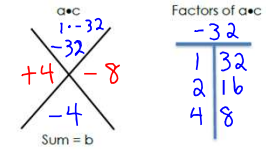
$$ax^2 + bx + c$$

STEP 1: ALWAYS check to see if you can factor out a GCF.

$$x^2 - 4x - 32 \quad a=1 \quad b=-4 \quad c=-32$$

STEP 2:

- Multiply the coefficients of the "a" and "c" terms together and place that number in the bottom of the "number diamond"
- Place the coefficient of the "b" term in the top.
- Make a factor t-chart for the factors of "a.c"
- Determine what two numbers can be multiplied to get your "a.c" term and added to get your "b" term.



STEP 3:

- Create a 2x2 Area Model and place your original "a" term in the top left box and "c" term in the bottom right box.
- Fill the remaining two boxes with the two numbers you found in your number diamond and place an x after them.

	X	-8
X	X ²	-8X
+4	+4X	-32

STEP 4:

- Factor out a GCF from each row and column to create the binomials or factors you are looking for.

STEP 5:

- Check your factors on the outside by multiplying them together to make sure you get all the expressions in your box.

Factored Form: $(x-8)(x+4)$
 $(x+4)(x-8)$

Factoring Trinomials using the Area Model

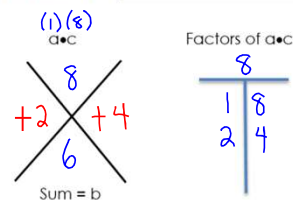
Factor the following trinomials.

$$x^2 + 6x + 8 \quad a=1 \quad b=6 \quad c=8$$

$$ax^2 + bx + c$$

	X	+4
X	X ²	+4X
+2	+2X	+8

Factored Form: $(x+4)(x+2)$

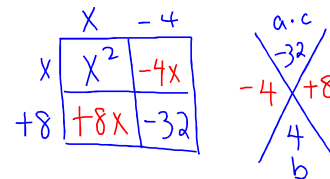


Factoring Trinomials using the Area Model

Using the Area Model, factor the trinomials.

a. Factor $x^2 + 4x - 32 \quad a=1 \quad b=4 \quad c=-32$

$$(x-4)(x+8)$$



Factoring Trinomials using the Area Model

Using the Area Model, factor the trinomials.

b. Factor $x^2 + 5x + 6$ $a=1$ $b=5$ $c=6$

$$(x+3)(x+2)$$

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

	$a \cdot c$	
$+2$	6	$+3$
	5	
	b	

Factoring Trinomials using the Area Model

Using the Area Model, factor the trinomials.

e. Factor $x^2 - 36$ $a=1$ $b=0$ $c=-36$

$$(x-6)(x+6)$$

Difference of Squares

	x	-6
x	x^2	$-6x$
$+6$	$+6x$	-36

	$a \cdot c$	
-6	-36	$+6$
	0	
	b	

Factoring Trinomials using the Area Model

Using the Area Model, factor the trinomials.

Look at these examples. (HINT: Is there a GCF?)

g. $\frac{2x^2}{2} + \frac{16x}{2} + \frac{24}{2}$

$$2(x^2 + 8x + 12)$$

$$2(x+6)(x+2)$$

	x	$+6$
x	x^2	$+6x$
$+2$	$+2x$	$+12$

	$a \cdot c$	
$+2$	12	$+6$
	8	
	b	

h. $\frac{4x^3}{4x} + \frac{12x^2}{4x} + \frac{8x}{4x}$ GCF=4x

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

$$4x(x+2)(x+1)$$

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

	$a \cdot c$	
$+1$	2	$+2$
	3	
	b	