

Solutions from last class

Check your answers while MacKenzie checks HW

4.1 Factor using the area model. State your answer.

1. $x^2 + 8x + 7$

$$\begin{array}{|c|c|} \hline x^2 & +7x \\ \hline +1x & +7 \\ \hline \end{array} = 8x$$

$$= (x+7)(x+1)$$

2. $x^2 + 11x + 18$

$$\begin{array}{|c|c|} \hline x^2 & +9x \\ \hline +2x & +18 \\ \hline \end{array} = +11x$$

$$= (x+9)(x+2)$$

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

$$\begin{array}{|c|c|} \hline x^2 & -3x \\ \hline -4x & +12 \\ \hline \end{array} = -7x$$

$$= (x-3)(x-4)$$

4. $x^2 + 14x + 45$

$$\begin{array}{|c|c|} \hline x^2 & +9x \\ \hline +5x & +45 \\ \hline \end{array} = +14x$$

$$= (x+9)(x+5)$$

5. $x^2 - 2x - 15$

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

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

6. $x^2 - 8x + 16$

$$\begin{array}{|c|c|} \hline x^2 & -4x \\ \hline -4x & +16 \\ \hline \end{array} = -8x$$

$$= (x-4)(x-4) \text{ or } (x-4)^2$$

7. $x^2 + 4x - 21$

$$\begin{array}{|c|c|} \hline x^2 & +7x \\ \hline -3x & -21 \\ \hline \end{array} = +4x$$

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

8. $x^2 - 3x - 18$

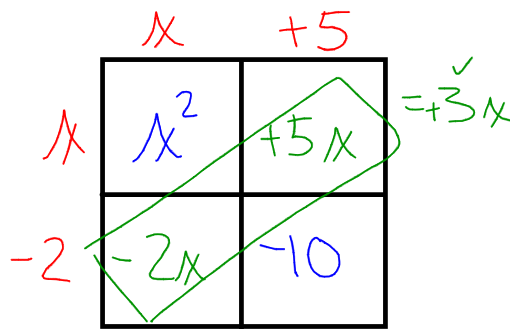
$$\begin{array}{|c|c|} \hline x^2 & -6x \\ \hline +3x & -18 \\ \hline \end{array} = -3x$$

$$= (x-6)(x+3)$$

Factoring Trinomials

Last class we learned to factor using an **area model**.

$$\boxed{x^2 + 3x - 10} = (x + 5)(x - 3)$$



① Put the first and last term in the area model

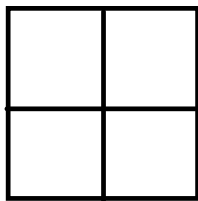
② Write values on the outside that work

* ③ Check that your middle term works
↳ change outside #'s if needed

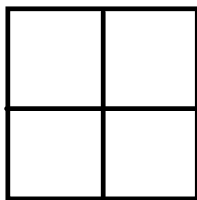
④ Write the factored form

Let's factor the following together as a warmup:

$$x^2 + 8x - 9$$



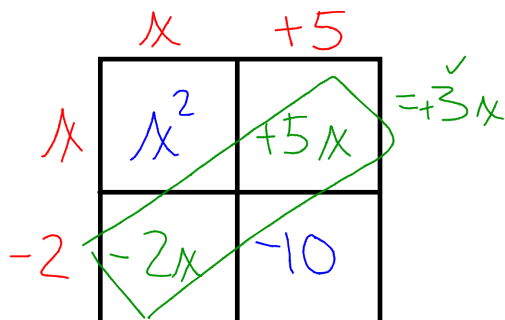
$$x^2 - 13x + 22$$



Factoring Trinomials

Last class we learned to factor using an **area model**.

$$\boxed{x^2 + 3x - 10} = (x + 5)(x - 2)$$



① Put the first and last term in the area model

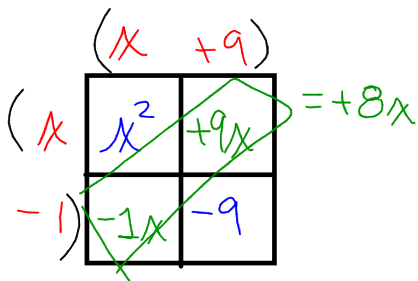
② Write values on the outside that work

* ③ Check that your middle term works
↳ change outside #'s if needed

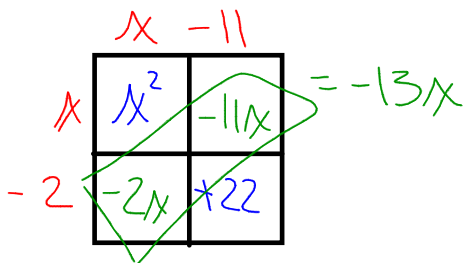
④ Write the factored form

Let's factor the following together as a warmup:

$$\boxed{x^2 + 8x - 9} = (x + 9)(x - 1)$$



$$\boxed{x^2 - 13x + 22} = (x - 11)(x - 2)$$



or

$$(x - 2)(x - 11)$$

On a piece of paper, with your neighbour

Factor using an area model:

$$x^2 + 8x + 12$$

$$x^2 + 5x - 36$$

$$x^2 - 5x - 14$$

$$x^2 - 10x + 16$$

Solutions

Factor using an area model:

$$x^2 + 8x + 12 = (x+6)(x+2)$$

$$x^2 + 5x - 36 = (x+9)(x-4)$$

$$x^2 - 5x - 14 = (x-7)(x+2)$$

$$x^2 - 10x + 16 = (x-2)(x-8)$$

Recall form last unit

What does each form tell you about the parabola?

Factored Form

pull down to reveal

$$y = -2(x - 3)(x + 4)$$

Zeros: 3 and -4

Vertex Form

$$y = 3(x - 4)^2 + 6$$

vertex: (+4, +6)

Standard Form

$$y = 4x^2 + 7x - 10$$

y-intercept = -10

What do we know about this quadratic?

$$y = x^2 - 6x - 16$$

What would be the benefit of factoring this equation?

What do we know about this quadratic?

$$y = x^2 - 6x - 16$$

$$y = x^2 - 6x \text{ } \textcircled{-16} \text{ } y\text{-intercept} = -16$$

What would be the benefit of factoring this equation?

We will also be able to identify the **zeroes**

Factoring to Find Zeros

handout

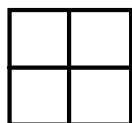
We know the **y-intercept** from an equation in **standard form**.

$$y = x^2 - 6x - 16 \quad \text{the y-intercept is } \underline{\hspace{2cm}}$$

If we rearrange the equation to **factored form** we can find the **zeros**.

To do this we need to **factor** using our area model.

$$y = x^2 - 6x - 16$$



the zeros are and

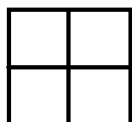
** remember the zeros change signs when we pull them out of the brackets*

Factor the following. Then state the y-intercept and zeros.

$$y = x^2 + 10x + 21$$

the y-intercept is

the zeros are and .

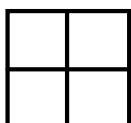


Try the next one with your partner

$$y = x^2 - 11x + 24$$

the y-intercept is

the zeros are and .



Factoring to Find Zeros

We know the **y-intercept** from an equation in **standard form**.

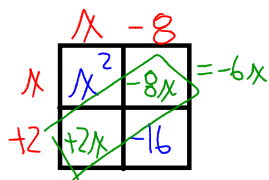
$$y = x^2 - 6x - 16 \quad \text{the y-intercept is } \underline{-16}$$

If we rearrange the equation to **factored form** we can find the **zeros**.

To do this we need to **factor** using our area model.

$$y = x^2 - 6x - 16$$

$$y = (x - 8)(x + 2)$$



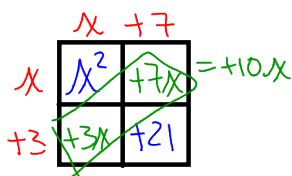
the zeros are +8 and -2

*** remember the zeros change signs when we pull them out of the brackets**

Factor the following. Then state the y-intercept and zeros.

$$y = x^2 + 10x + 21$$

$$y = (x + 7)(x + 3)$$

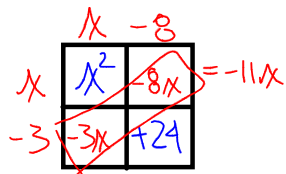


the y-intercept is +21

the zeros are -7 and -3.

$$y = x^2 - 11x + 24$$

$$y = (x - 8)(x - 3)$$



the y-intercept is +24

the zeros are +8 and +3.

Individual Practice - Back of the sheet (finish in class or for homework)

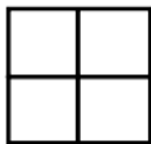
1. For each relation, find the y-intercept, then factor to find x-intercepts

a) Standard Form:

$$y = x^2 + 7x + 10$$

Y-int = _____

Factor:



Factored form:

x-int's: _____

Standard form:

$$y = x^2 + 4x - 21$$

Y-int = _____

Factor:



Factored form:

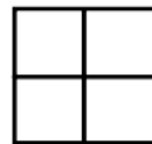
x-int's: _____

b) Standard form:

$$y = x^2 - 8x + 12$$

Y-int = _____

Factor:

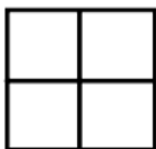


Factored form:

x-int's: _____

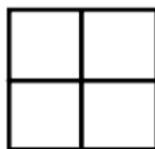
2. For each relation, factor to find the x-intercepts (zeroes).

a) $y = x^2 + 6x + 5$



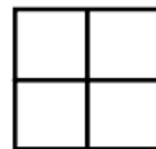
zeroes: _____

c) $y = x^2 - 12x + 20$



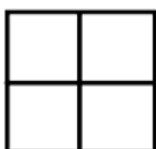
zeroes: _____

e) $y = x^2 - 4x - 21$



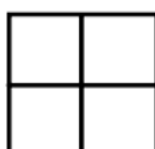
zeroes: _____

b) $y = x^2 - 5x - 36$



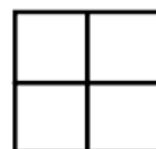
zeroes: _____

d) $y = x^2 - 9x + 20$



zeroes: _____

f) $y = x^2 - 6x - 27$



zeroes: _____

Individual practice

handout

1. For each relation, find the y-intercept, then factor to find x-intercepts

a) Standard Form:

$$y = x^2 + 7x + 10$$

Y-int = 10

Factor:

x	x^2	$5x$	$\rightarrow 7x$
$+2$	$2x$	10	

Factored form:

$$y = (x+5)(x+2)$$

x-int's: -5 and -2

Standard form:

$$y = x^2 + 4x - 21$$

Y-int = -21

Factor:

x	x^2	$7x$	$\rightarrow 4x$
-3	$-3x$	-21	

Factored form:

$$y = (x+7)(x-3)$$

x-int's: -7 and +3

b) Standard form:

$$y = x^2 - 8x + 12$$

Y-int = 12

Factor:

x	x^2	$-6x$	$\rightarrow -8x$
-2	$-2x$	12	

Factored form:

$$y = (x-6)(x-2)$$

x-int's: +6 and +2

Individual practice

handout

2. For each relation, factor to find the x-intercepts (zeroes).

a) $y = x^2 + 6x + 5$

x	x^2	$+1x$	$\rightarrow 6x$
$+5$	$5x$	5	

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

zeroes: -1 and -5

b) $y = x^2 - 5x - 36$

x	x^2	$-9x$	$\rightarrow -5x$
$+4$	$+4x$	-36	

$$y = (x-9)(x+4)$$

zeroes: 9 and -4

c) $y = x^2 - 12x + 20$

x	x^2	$-10x$	$\rightarrow -12x$
-2	$-2x$	20	

$$y = (x-10)(x-2)$$

zeroes: 10 and 2

d) $y = x^2 - 9x + 20$

x	x^2	$-5x$	$\rightarrow -9x$
-4	$-4x$	20	

$$y = (x-5)(x-4)$$

zeroes: 5 and 4

e) $y = x^2 - 4x - 21$

x	x^2	$-7x$	$\rightarrow -4x$
$+3$	$+3x$	-21	

$$y = (x-7)(x+3)$$

zeroes: 7 and -3

f) $y = x^2 - 6x - 27$

x	x^2	$-9x$	$\rightarrow -6x$
$+3$	$+3x$	-27	

$$y = (x-9)(x+3)$$

zeroes: 9 and -3

Let's start our Pink Sheets for unit 4
MacKenzie to handout duotangs

Unit 4 - Quadratics and Factoring

Factoring:

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

x^2	
	-10

- ① Put the first and last term in the window
- ② Write values on the outside that work
- * ③ Check that your middle term works
↳ change outside #'s if needed
- ④ Write the factored form

Add your own factoring question with

- a **negative middle term** and **positive third term**

Unit 4 - Quadratics and Factoring

Factoring:

$$\boxed{x^2} + 3x \boxed{-10} = (x+5)(x-3)$$

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

① Put the first and last term in the window

② Write values on the outside that work

* ③ Check that your middle term works
↳ change outside #'s if needed

④ Write the factored form

Add your own factoring question with

- a **negative middle term** and **positive third term**

Hand back Evidence Records (and leftover tests if you were absent Monday)