Name: ____________________ Date: __________________ MFM 2P1

CHAPTER 7: Quadratic Expressions

DAY	SECTION / TOPIC	SEATWORK / HOMEWORK
1	7.1 - Multiply Two Binomials	Page 286 – 289 #1ace, 2ac, 3ace, 4ab, 5, 6
2	7.2 - Common Factoring	Page 294 – 297 #1ac, 2acd, 3acd, 4ac, 6acd, 7ab, 8a, 9ab
3	(consolidate) **QUIZ (Multiply Two Binomials, Common Factoring)**	
4	7.3 - Factor a Difference of Squares	Page 302 – 305 #3, 4acdfgi, 6 – 8
5, 6	7.4 - Factor Trinomials in the Form y = $x^2 + bx + c$	(Day 5) Page 309 – 311 #2, 3ac (Day 6) Page 309 – 311 #4, 7, 8
7	**QUIZ (Factoring – Difference of Squares and Factoring Trinomials)** Review	Page 312 – 313 #1, 2ac, 3ac, 5ab, 6
8	Review	Page 312 – 313 #7, 8ac, 10ac, 12abc, 16ab
9	**CHAPTER 7 TEST**	

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Name: ________________________ Date: _____________________ MFM 2P1

7.1 – MULTIPLY TWO BINOMIALS

KEY CONCEPTS

The product of two binomials, each with a variable term and a constant term, is a quadratic expression of the form $ax^2 + bx + c$.

The square of a binomial is a **perfect square trinomial**.

The product of two binomials can be found by **multiplying each term in one binomial** by each term in the other binomial using a variety of methods.
→This technique is called **FOIL (First Outside Inside Last)**

EXAMPLE 1 *Find the Product of Two Binomials*

Find the product of each of the following:

(a) $(x + 2)(x + 5)$ (b) $(x – 1)(x + 4)$ (c) $(x – 3)(x – 6)$

EXAMPLE 2 *Finding the Product of Two Binomals, with Constants in Front of the Variable*

Find the product of each of the following:

(a) $(x + 4)(2x + 3)$ (b) $(3x + 2)(x – 1)$

(c) $(4x + 1)(5x – 2)$

Name: ________________________ Date: _____________________ MFM 2P1

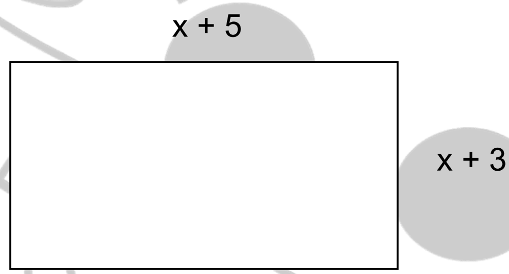
EXAMPLE 3 *Squaring a Binomial*

Find the product of each by expanding

(a) $(x - 7)^2$ (b) $(3x + 1)^2$

EXAMPLE 4 *Application: Calculating the Area of a Rectangle*

A rectangular ski area has a width equal to *x* + 3 and a length equal to *x* + 5. Both measures are in kilometres.



(a) Find the quadratic expression that represent the **Area** of the skiing area.

Area = length x width

(b) Using your expression from (a), find the actual area when **x = 3**

Homework: Page 286 – 289 #1ace, 2ac, 3ace, 4ab, 5, 6

Name: ________________________ Date: _____________________ MFM 2P1

7.2 – COMMON FACTORING

KEY CONCEPTS

Some polynomials can be factored by finding the **GCF (greatest common factor).**

The GCF for a polynomial may be a **constant** (number), a **variable**, or **combination** of both.

→ The GCF must divide evenly into each term in the polynomial

→When finding the GCF of a variable term, always use the exponent with the lowest value

If the area of a rectangle is given as a polynomial, factor the polynomial to find the possible side lengths of the rectangle.

EXAMPLE 1 *Getting Ready: Determining the Greatest Common Factor*

Find the **greatest common factor (GCF)** for each set of terms

(a) $3x$, 15 GCF = _____ (b) $10x^2$, $25x$ GCF = _____

*(c) $-4x^3$, $12x^2$, $20x$ GCF = _____

EXAMPLE 2 *Common Factoring*

Factor the following expressions:

(a) $3x + 15$ GCF = _____

= ______( )

(b) $10x^2 - 25x$ GCF = ____

= ______( )

COMMON FACTORING

1. Determine the GCF. Write the GCF in front of the brackets.

2. Divide each term by the GCF and write down the answers inside the brackets.

(c) $-4x^3 + 12x^2 - 20x$ GCF = _____

= ______( )

EXAMPLE 3 *Application: Finding the Dimensions of a Rectangle*

The area of a CD case is represented by the binomial $\mathbf{16x + 4x^2}$.

(a) Factor the area of the CD case to determine the expression for its dimensions

$16x + 4x^2$ GCF = ______

(b) Using the expressions from (a), determine the actual dimensions if **x = 5 cm**.

(c) Determine an algebraic expression for the **Perimeter** using the expressions from (a) and substituting them into the formula given

Perimeter = 2l + 2w

<u>Homework</u>:
Page 294 – 297 #1ac, 2acd, 3acd, 4ac, 6acd, 7ab, 8a, 9ab

Name: ________________________ Date: _____________________ MFM 2P1

7.3 – FACTOR A DIFFERENCE OF SQUARES

KEY CONCEPTS

A **difference of squares** is a binomial with **square terms** as the first and second terms, **separated by a <u>subtraction</u> sign**.

EXAMPLE: $x^2 - 25$

The factors of a difference of squares are **<u>two</u> binomials**.
→In one binomial factor the square roots of each term of a difference of squares are <u>added</u>,
→in the other binomial factor the square roots of each term of a difference of squares are <u>subtracted</u>.

EXAMPLE 1 *Factoring Differences of Squares*

Factor the following *difference of squares*. Check your answer by expanding.

(a) $x^2 - 16$ Check:

(b) $100 - x^2$ Check:

* (c) $9x^2 - 25$ Check:

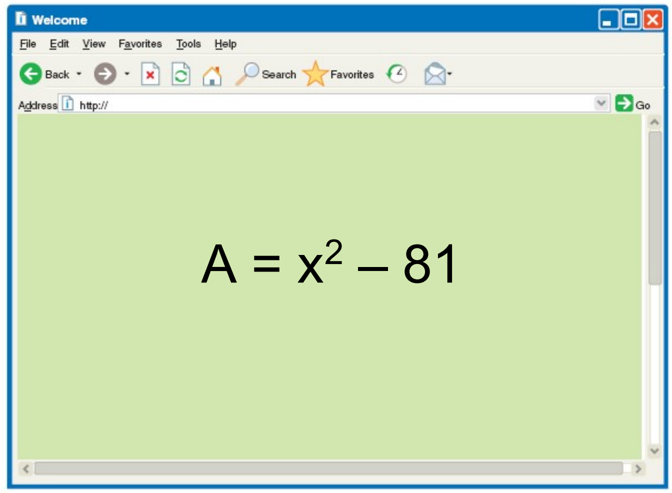
> ***FACTORING DIFFERENCES OF SQUARES***
>
> 1. Write down two sets of brackets
> 2. Place a "+" in the first bracket and " – " in the second bracket.
> 3. Take the **square root** of the *first* term. Place this answer in the first term of each bracket.
> 4. Take the **square root** of the *second* term. Place this answer in the second term of each bracket.

Name: ________________________ Date: _____________________ MFM 2P1

EXAMPLE 2
Application: Area

A screen capture of a webpage is measured by its area.

(a) Factor the expression for area to find the expressions for the dimensions of the webpage.



(b) Using the expressions from (a), calculate the area when **x = 20 cm**

<u>Homework</u>:
Page 302 – 305 #3, 4acdfgi, 6 – 8

Name: ________________________ Date: _____________________ MFM 2P1

7.4 – FACTOR TRINOMIALS IN THE FORM $y = ax^2 + bx + c$

KEY CONCEPTS

To find the factors of a trinomial in the form $x^2 + bx + c$, look for the pair of numbers

→ when multiplied, the product is *c*.

→when added, the sum is *b*

Factoring is the opposite of expanding.

EXAMPLE 1 *Factoring Trinomials*

Factor each trinomial. Check your answers by expanding:

(a) $x^2 + 5x + 6$ P = _____ Check:

S = _____

(b) $x^2 + 3x - 4$ P = _____ Check:

S = _____

(c) $x^2 - x - 30$ P = _____ Check:

S = _____

Name: ________________________ Date: ____________________ MFM 2P1

(d) $x^2 - 12x + 32$ P = _____ Check:

S = _____

EXAMPLE 2 *Finding the Dimensions of a Rectangle*

A rectangle has an area represented by the trinomial $\mathbf{x^2 + 2x - 24}$.

$\mathbf{x^2 + 2x - 24}$

(a) Factor the trinomial to find expressions for the dimensions of the rectangle.

(b) Calculate the actual dimensions if **x = 40 m**.

<u>Homework</u>:
Page 309 – 311 #2, 3ac, 4, 7, 8