

The Algebra of Quadratics Unit



Big idea

This unit will cover expanding and factoring methods you will be required to know for all the quadratic units that will follow. You should have seen most of these methods in grade 10. (If you took applied you have not seen the complex trinomial factoring method, since only grade 10 academic course covered that.) You must understand that factoring trinomials can be taught in many different methods (decomposition/Australian/criss cross methods). The criss cross method is the one you'll concentrate on in this class since it is the most efficient of all the methods. Without practicing you may not do very well in this unit and that would carry on into the next two units. Please take the time to practice so that the next two unit marks will not suffer for it.

I know all the prior concepts related to this unit. (If not STOP & complete more review)

Place a if you are **confident** in that section.
 Place a if you are **just ok** in that section.
 Leave it blank if you are **lost** in that section.
 If there are gaps in any row, please see the teacher for extra help in that topic.



Learning Goal

Finding equations of and graphing lines, finding equations of and graphing quadratics, simplifying expressions, solving equations, expanding, factoring, problem solving with lines and quadratics

- Expanding Quadratic Expressions
Section 2.1 #3,6,10,11,13
- Common Factoring
Section 2.2 #3,6,7,8,9
- Simple Trinomial Factoring
Section 2.3 #3,6,8,9,11,13
- Complex Trinomial Factoring
Section 2.4 #4,5,7,10,12
- Factoring Special Cases
Section 2.5 # 2,3,4,6,11
- Mix of Factoring Methods
three Handouts
-
- two EXTRA assignments KU + APP&TIPS

Success Criteria

Assessment **as** Learning for Learning and **of** Learning

I can understand the lesson (If not, ask clarifying questions. Be specific – "what part is unclear?")	I can do a question with an example to follow. (If not, see the teacher for extra help)	I can do questions independently (If not, redo a solved example without looking at solutions)	I can explain/communicate this concept in my own words – JOURNAL (If not, practice explaining steps done in a solved example)	I can apply this concept in other/new contexts/situations (This can be only attained with practice)	I am very confident and am able to complete questions quickly (If not, time yourself to see progress)	I completed the practice in EACH section	I completed the practice test and the review section for this unit.
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KU 	KU 	APP 	COMM 	TIPS 		HW 	TEST
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P122 - Chapter Self-Test
P120-121 Chapter Review Questions



Tentative TEST date _____

Reflect – TEST mark for this unit _____, Overall mark now _____.
 Looking back on this unit, what should you plan to improve upon before the exam?

Corrections for the textbook answers:

Date: _____

Name: _____

Expand & Look For Patterns – these will help you factor later on.

	A	B	C	Examine the solutions carefully. State any patterns or similarities.	Generalization
1	$(x+4)(x-4)$	$(2x+3)(2x-3)$	$(x+y)(x-y)$		$(A+B)(A-B)$
2	$(4x+1)(4x+1)$	$(x+3)(x+3)$	$(x+y)(x+y)$		$(A+B)^2$ $= (A+B)(A+B)$
3	$(x-2)(x-2)$	$(3x-3)(3x-3)$	$(x-y)(x-y)$		$(A-B)^2$ $= (A-B)(A-B)$

Expanding Quadratic Expressions



1. Expand and simplify.



a. $3(x+4)(x-2)$

b. $2b(b+1) - (b-1)^2$



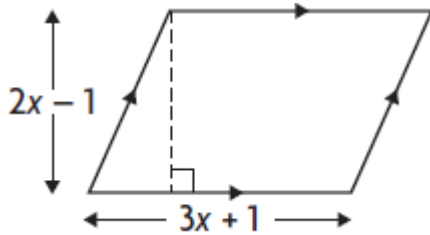
c. $-2(3a+5)(a-2)$

d. $3(2x-1)^2 - 2(x-1)(x+1)$

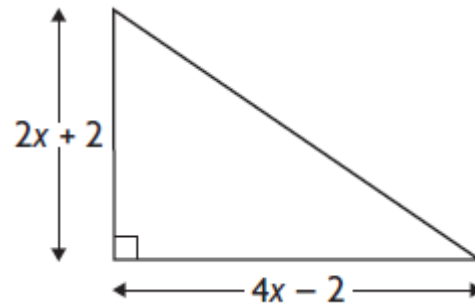
2. Write an expression for the area of each shape. Expand and simplify



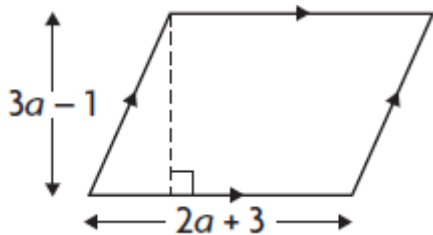
a.



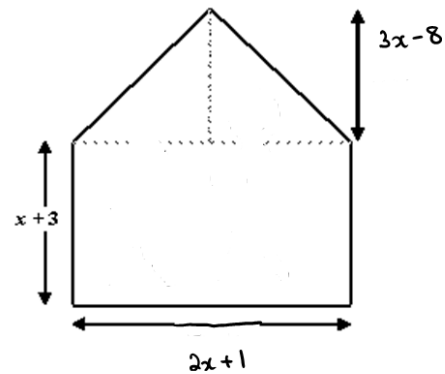
b.



c.



d.



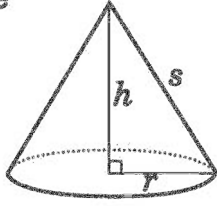
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3. Simplify the expression for the volume of the cone if $V = \frac{\pi r^2 h}{3}$, $r = 2 + x$, and $h = 2x - 3$

Cone



4. You need to understand when to expand and when distribute the exponent. Simplify the following, if possible. Summarize the rules.

a. $(5x^2y^3)^2$

b. $(5x^2 + y^3)^2$

c. $\sqrt{25x^2y^4}$

d. $\sqrt{25x^2 - y^4}$

e. $2x(3x)(4x^2)$

f. $(2 - x)(3x + 4x^2)$

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Common Factoring



1. Summarize the steps of common factoring.

2. Factor the following



a. $9x^3 - 15x^2 + 3x$

b. $25x^2 - 100x^3$

c. $2\pi h(r+h)^2 + 4\pi(r+h)h^2$

d. $25x^2 - 5x - 15xy + 3y$



e. $8x^4 - 4x^3 + 20x^2$

f. $54x^5 + 135x^2$


g. $3(g-h)^2 - 5(g-h)$

h. $3mp - 6m - 4p + 8$

i. $27x^3y^3 + 18x^2y^2 + 9xy$

j. $33x^3y^5 + 24x^2y^2 + 3x^2y^4$

k. $2x(x+7) + 3(x+7)$

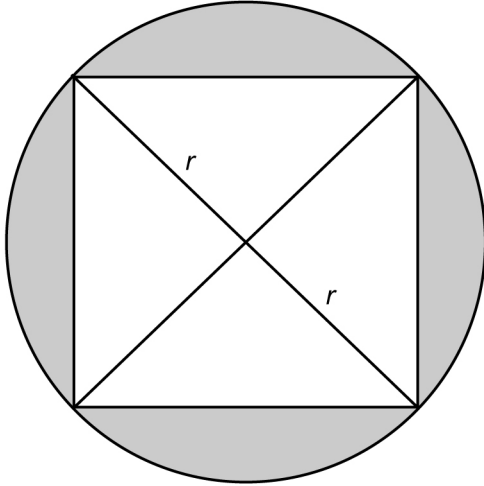
l.  $2y(x-3) + 4z(3-x)$

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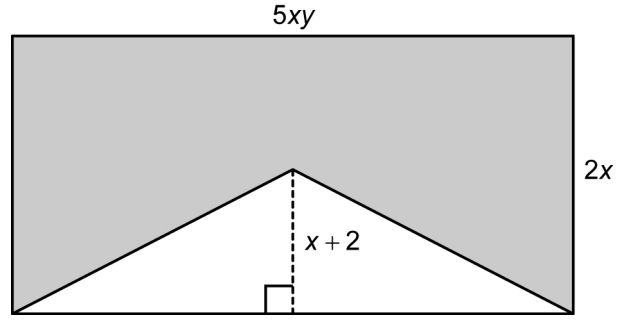
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3. Write an expression in factored form for the area of each shaded region.


a. 




b. 




Simple Trinomial Factoring


-  1. What type of trinomial is considered simple and what type is considered complex? Give an example of a trinomial that looks like it maybe complex but isn't.

-  2. Summarize how to factor simple trinomials

3. Factor the following

 a. $x^2 + 4x - 12$

b. $x^2 + 8x + 12$

-  4. Summarize how to figure out what signs (+ or -) to use in the factoring process.


5. Find two integers with the given product and sum.
sum = 14 and product = 48

sum = 2 and product = -15

sum = -1 and product = -30

sum = -3 and product = 2

6. Factor the following, if possible

 a. $x^2 - 7x - 18$

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

c. $c^2 + 13c - 30$

d. $x^2 + x + 1$

e. $d^2 - 12d + 35$

f. $x^2 + 15x - 16$

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7. Sometimes you must do both: common factor and trinomial factor. Show how you can do this in any order for the following example $3x^2 - 12x - 36$

8. Factor fully.

a. $-2x^2 + 2x + 4$

b. $6x^2 - 42x + 72$

c. $-3x^2 - 18x - 24$

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



9. Determine some values of k so that the trinomial can be factored.

a. $x^2 + kx - 12$

b. $x^2 - 9x + k$

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Complex Trinomial Factoring



1. Summarize how to factor complex trinomials

2. Factor the following.



a. $8x^2 + 2x - 3$

b. $3x^2 + 14x + 8$



c. $2x^2 + x - 10$

d. $4x^2 - 11x - 15$

e. $2x^2 + 7x + 3$

f. $6x^2 + 10x - 4$

g. $56x^2 - 9x - 2$

h. $12c^2 - 26c - 16$

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Name: _____



i. $6x^2 - 5xy - 4y^2$

j. $12r^2 + 7rs - 10s^2$

k. $10x^4 - 3x^2 - 18$

l. $20x^6 - 59x^3y^2 + 42y^4$

3. Summarize what the variable pattern should be for the factoring to work.

4. Find some values of k so that the trinomial can be factored.

a. $6x^2 + kx + 10$

b. $4x^2 - 12x + k$

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Factoring Special Cases



1. What are the conditions for something to be classified as a difference of squares? How do you factor the difference of squares? Why does it work that way?



2. Factor the following

a. $4x^2 - 25$

b. $100 - (x-3)^2$

c. $25x^2 - 16y$

d. $x^2 - 6$



e. $100r^2 + 81s^2$

f. $121x^2 - 9y^2$

g. $64a^2 - 49b^4$

h. $(x+2)^2 - 36$

i. $y^2 - 8$

j. $81r^2 - 4t^3$



k. $50x^2 - 72$

l. $16x^4 - 100y^4$

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3. What are the conditions for something to be classified as a perfect square? How do you factor a perfect square?

4. Factor the following



a. $4x^2 + 32x + 64$.

b. $4x^2 - 12xy + 9y^2$



c. $100 - 20x + x^2$

d. $49x^2 + 70xy + 16y^2$

e. $25x^2 + 20x + 4$

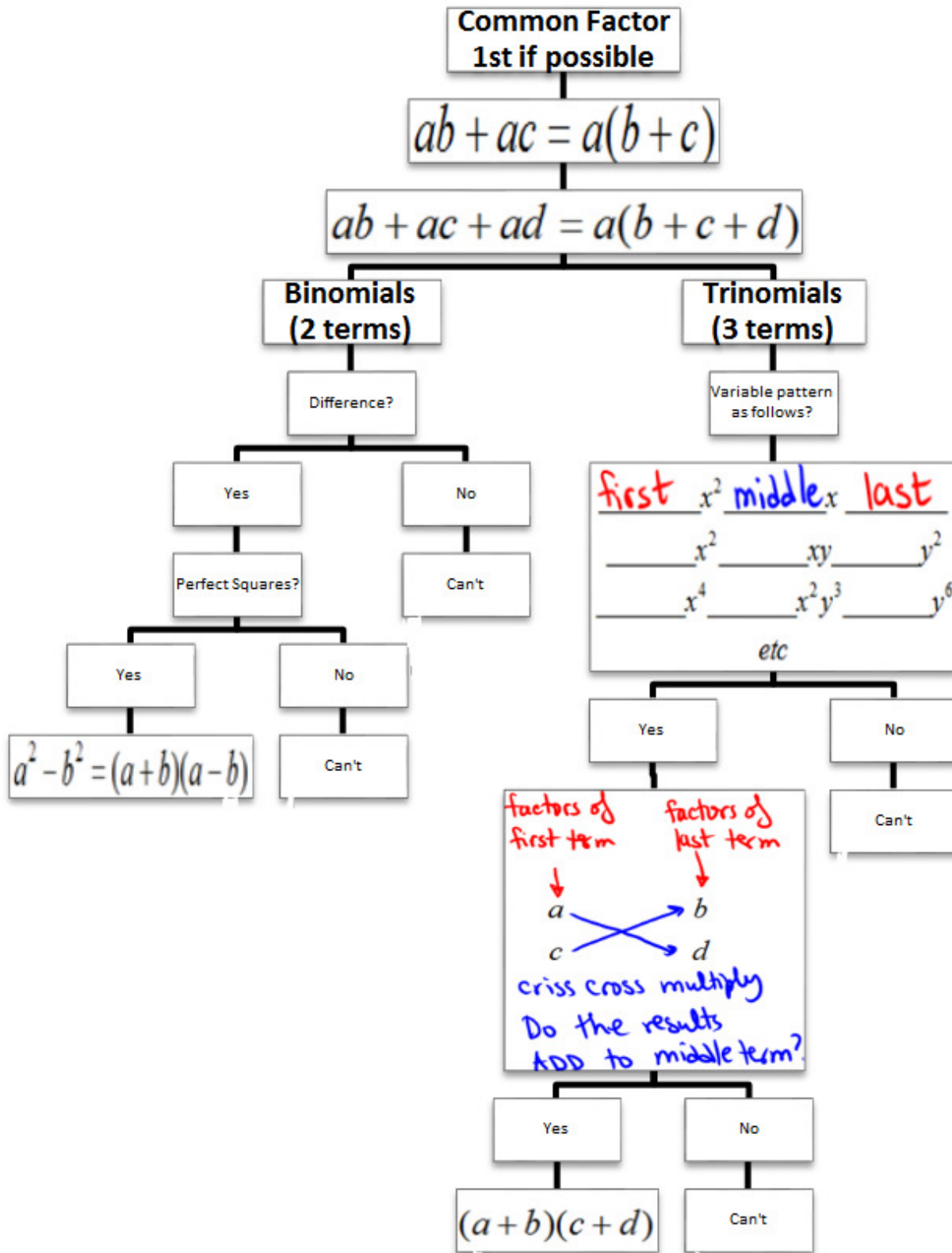
f. $3x^2 - 6x + 3$



g. $25x^2y^2 - 150xyab + 225a^2b^2$

h. $4(3x - 1)^2 + 28(3x - 1) + 49$

Mix of Factoring Methods



Date: _____

Name: _____

Factor the following as much as possible.



1. $18x^2y^6 + 39xy^3 - 7$

2. $16x^2 - 49$

3. $2y^2 - 12y + 18$

4. $8x^3 - 4x^2$



5. $4x^2 - 28x + 40$

6. $7x^2 - 54xy^2 - 16y^4$

7. $8x^2 - 12x^4 + 24$

8. $30x^2y - 20x^2y^2 + 10x^3y^2$

9. $9x^2 + 29x - 28$

10. $2x^2 + 12x + 16$

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11. $7x^2 - 19x - 6$


12. $4x^2 - 44x + 121$

13. $16x^2 - 81$

14. $8mn^2 - 12mn - 16m^2n$

15. $28a^2 - 7a^3$

16. $6 - 27x - 15x^2$

 17. $12b^2a^4 - 75a^2$

18. $300 - 48x^4$

19. $(2c - 5)^2 - 121$

20. $(x + a)^2 + 6(x + a) + 8$