

Unit 0 – Preview of Algebra JOURNAL



Big idea/Learning Goals

In real life there are relationships that depend upon variables. For example, earnings versus time worked, or pressure under water versus depth, or distance travelled versus time. Most of these relationships are **non linear**, which means equations are not very simple anymore. To help you with this complication, we will begin with algebra skills which you will see again in Units 3 & 4 & 5. Hopefully seeing these topics twice will help you become really good at them since they are foundational to your math career later in high school.

You should complete the following practice topics independently. You may not be independent right away, and that is ok, ask for help, use examples in notes, however on the day of the test, remember that you must do the questions without any help or notes

Date	Topics	Finished the journal? Made corrections?	Did you do the HW? Checked if it was correct?	Tentative TEST date: _____
2days	Exponent Laws HW handout DAY 1 HW handout DAY 2			Questions to ask the teacher:
2days	Simplify Expressions HW handout DAY 3 HW handout DAY 4			
5days	Factor HW handout DAY 5 HW handout DAY 6 HW handout DAY 7 HW handout DAY 8 HW handout DAY 9			
2days	Complete the square HW handout DAY 10 HW handout DAY 11			



Reflect

What are your strengths as a student?

What are your weaknesses that you'll try to improve upon this semester?

DAY1 & 2 – Exponent Laws

Multiplication of Powers

Product	Expanded Form	Single Power
$x^4 \times x^3$	$= (x \times x \times x \times x) \times (x \times x \times x)$	$=$
$m^3 \times m^2$	$=$	$=$
$x^a \times x^b =$		

Division of Powers

$x^7 \div x^3$	$= \frac{x \times x \times x \times x \times x \times x \times x}{x \times x \times x}$	$=$
$m^6 \div m^2$	$=$	$=$
$x^a \div x^b =$		

Powers of Powers

$(y^3)^4$	$= (y \times y \times y) \times (y \times y \times y) \times (y \times y \times y) \times (y \times y \times y)$	$=$
$(m^3)^2$	$=$	$=$
$(x^a)^b =$		

Negative Powers

Division	Written as negative exponent	Expanded Form	Written as positive exponent
$x^3 \div x^7$	$x^{3-7} = x^{-4}$	$\frac{xxx}{xxxxxxxx}$	
$y^2 \div y^5$			
$x^{-a} =$			

Zero Powers

Question	Written as zero exponent	Expanded Form	Answer
$x^3 \div x^3$	$x^{3-3} = x^0$	$\frac{xxx}{xxx}$	
$a^{-6} \times a^6$			
$m^0 =$			

NOTES:

Simplify, write in positive exponent version.

1. 4^{-3}

2. $\frac{1}{6^{-3}}$

3. $\left(\frac{2}{3}\right)^{-4}$

4. $2x^{-3}$

5. $\frac{3}{4^{-2}}$

6. $\frac{8^{-2}}{3}$

7. $(-4x^{-1}z^{-2})^{-2}$

8. $(5x^4y^{-3}z^2)(-2x^2y^4z^{-1})$

9. $\frac{5^{-2}x^{-4}y^3}{2^{-3}x^{-5}y}$

10. $(4x)^2 \times 4x^2$

11. $(3d^{-3})^3 \times 3d^{-2}$

12. $\frac{(-3c^4)^{-2}}{c^{-1}}$

13. $2(2x^5y^0)^{-2} \times (2x^{-1}y^2)^{-3}$

14. $\left(\frac{(2a^{-2})^3 a^3}{2^2 a^{-4}}\right)^{-3}$

15. $\frac{(-2xy^3 \times 3x^{-3}y^{-2})^3}{6x^0y^{-1}}$

DAY 3 & 4– Simplify Monomial Expressions

1. $(2xy)(5yx^2)$

2. $(8x^2y^3)(-2x^3y^5)$

3. $18x^2y^5 \div 6x^2y^3$

4. $-20x^8y^4z^3 \div -4x^3y^2$

NOTES:

Simplify Polynomials

5. $3x + 6y + 4x + 3y + 2x^2 + 5x + 4x^2 - 3x$

6. $-2xy + 5x^3 + 2x(4xy) - xy + x(10x^2) - 6y(-3x^2)$

7. $(4x + 5y) + (3x - 2y)$

8. $(3x^2 - 6x) - (-5x - 9x^2)$

9. $-2x^2(4x + 5)$

10. $3x^2y^3(-2x^2y + 2xy^4 + 3)$

NOTES:

Multiply two Binomials

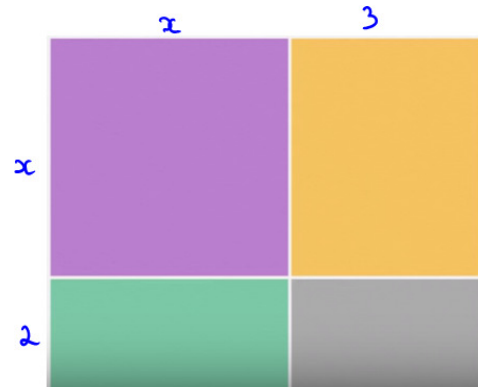
Show how to multiply two binomials using different methods

11. $(x+3)(x+2)$

Using distribution arrows

Using FOIL

Using a visual



Expand and simplify.

12. $3(5x-2)(3x+5)$

13. $(x+3)(x+7) - (x+5)^2$

14. $(3x-5)^2$

15. $-(x-5)(x+5)$

NOTES:

Expand and simplify.

16. $2(x-5)^2 - 4$

17. $(\frac{8}{9}a^2 + b - 6) - (\frac{5}{4}b + 3c - 2a^2 - 9)$

18. $3x(x+2)(x-1) - 6(-x^2 + x - 4)^2$

DAY 5 & 6 – Greatest Common Factoring (GCF) – for any # of terms

1. $-3x - 18$

2. $24x - 30$

3. $-15x^2 - 25x$

4. $60x^2 - 25x + 15$

5. $21x^4 - 28x^3 - 35x^2$

6. $x^2y^3z - 2xy^2$

7. $24x^3 - 15x^2 - 20x$

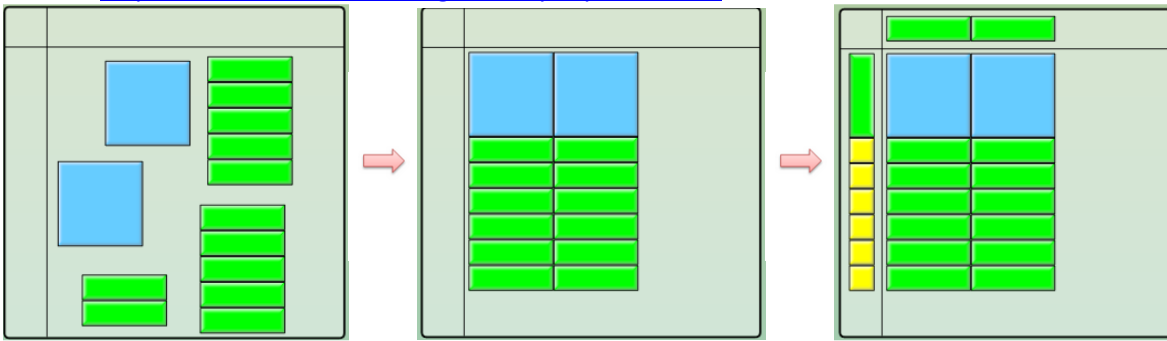
8. $16x^3y^3 + 24x^5y^7 - 32x^2y^4$

9. $-30x^4y^6 - 35x^3y^5 - 55x^7y^3$

NOTES:

10. Explain how this diagram shows common factoring visually.

<http://illuminations.nctm.org/Activity.aspx?id=3482>



Factor by Grouping – for 4 terms

11. $4a^2(2b + d) - 5c(2b + d)$

12. $12x(3y + 8) + 17y(3y + 8)$

13. $2bm - 4bn + am - 2an$

14. $-8ad + 12bc - 24bd + 4ac$

15. $-5 - 10x + x^2 + 2x^3$

16. $12ab - 9ac - 28bd + 21cd$

17. $25j^3 + 15j^2 - 5j - 3$

18. $64d^3 - 40d^2 - 24d + 15$

19. $36n^3 - 27n^2 - 8n + 6$

NOTES:

DAY 7 & 8 – Factor Simple Trinomials – for 3 terms and no ‘a’ value

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

2. $x^2 - 1x - 12$

3. $2x^2 + 6x - 8$

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

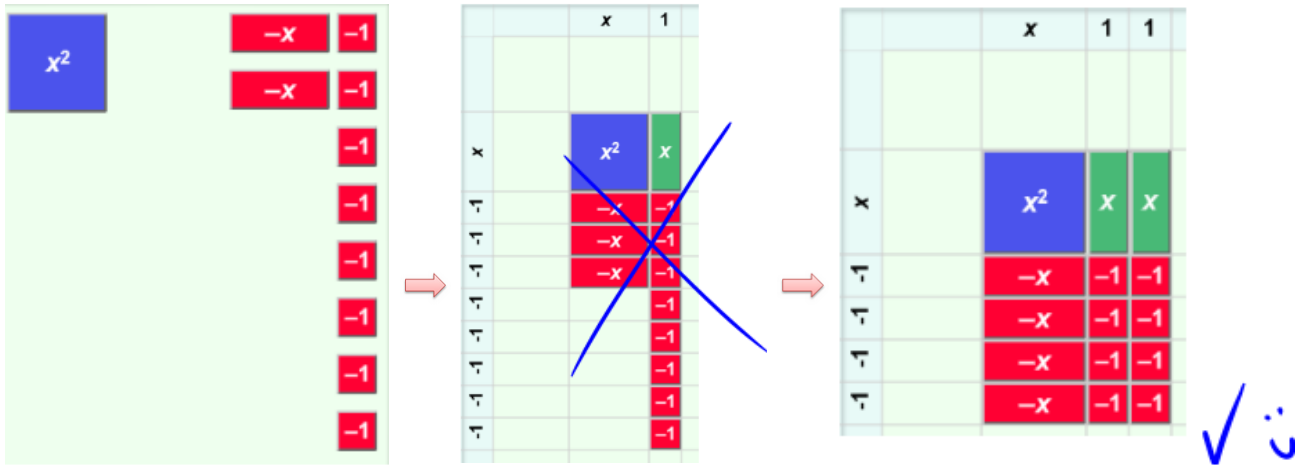
5. $m^2 - 9mp - 112p^2$

6. $-a^2 - 2ab - b^2$

NOTES:

7. Explain how this diagram shows simple trinomial – SUM & PRODUCT factoring visually.

<https://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=111>



Factor Complex Trinomials – for 3 terms with ‘a’ value

1. $16x^2 - 8x + 1$

2. $2x^2 + 3x - 20$

3. $2x^2 + 13x + 6$

4. $4x^2 - 27x + 35$

5. $9x^2 + 12x + 4$

6. $-15 - y + 6y^2$

NOTES:

8. Develop Rules for Using Algebra Tiles and explain how to factor complex trinomials visually.

<http://staff.argyll.epsb.ca/jreed/math9/strand2/2213.htm> and scroll down

Correct	Incorrect	Rules
<p>Explain Question:</p>		

Factor Completely.

7. $8x^2 - 22xy - 21y^2$

8. $15a^2 - 25ab - 10b^2$

9. $m^4 - 9m^2 - 112$

10. $3x^2 - 18x + 15$

11. $6x^2 - 33x + 36$

12. $14x^2 - 62x - 40$

DAY 9 – Factor Special Products – Difference of Squares – for 2 terms

1. $16x^2 - 25$

2. $81m^4 - 625y^6$

3. $-9m^2 + 49$

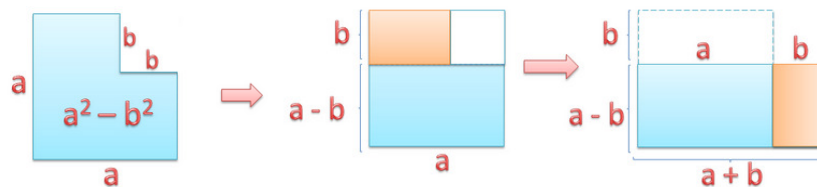
4. $16 + 9y^2$

5. $x^2 - 7$

6. $x^8 - 1$

NOTES:

7. Explain how this diagram shows the difference of squares formula visually.



Factor Special Products – Perfect Square Trinomials – for 3 terms

8. $x^2 - 12x + 36$

9. $x^2 + 18xy + 81y^2$

10. $m^2b^2 - 10mb + 25$

NOTES:

Factor Completely

11. $\frac{x^2}{25} - 1$

12. $4a^2 - 80a + 400$

13. $32a^3 + 16a^2 + 2a$

Factor Completely

14. $48x^2 - 27y^2$

15. $8e^2 - 50$

16. $x^3 - xy^2$

17. $(3a + 7)^2 - 121$

18. $(5j - 3)^2 - 49$

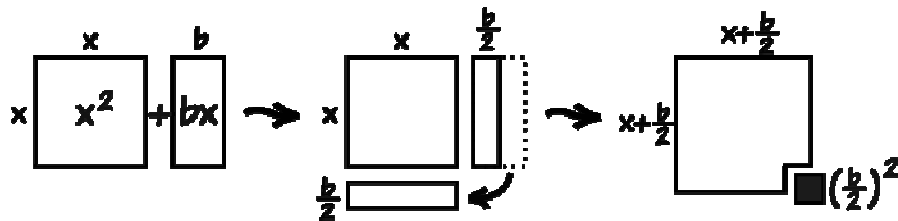
19. $9m^2 - (2n + 5)^2$

DAY 10 & 11 – Completing the Square

1. $-3x^2 + 24x - 1$

NOTES:

20. Explain how this diagram shows the completing the squares method visually.



Complete the square no fractions

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

3. $4x^2 - 32x + 17$

4. $-5x^2 - 10x - 30$

Complete the square WITH fractions

5. $\frac{2}{3}x^2 - 12x - 20$

6. $2x^2 - 10x + 12$

7. $-3x^2 + 8x - 15$

Complete the square to Solve

8. $x^2 - 36 = 0$

9. $x^2 + 6x - 16 = 0$

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

NOTES: