Algebra Chapter 8.1- Skeleton Notes

Review: Simplify each problem then state the exponent rule that supports your answer.

1. $x(x^4)$ _____ Rule:

2. $(x^4)^2$ _____ Rule:

Define the following vocabulary using the Glossary in your textbook, section 8.1 or your math notes. Then provide an example of each vocabulary term.

Factor-	
Coefficient –	
Variable-	
Constant-	
Monomial-	
Polynomial-	
Binomial-	
Trinomial-	

What is the difference between a term and a factor?

Degree of a **monomial/term**:
Problem/Got its #1

Degree of a **Polynomial**:

Polynomial	Terms	Degree of Term(s)	Degree of Polynomial

Why is it important to know the degree of each term and the degree of the polynomial?

Classifying the Polynomial:

Degree of a Polynomial	Number of Terms in a Polynomial

Problem/ Got its #3

Subtracting Polynomials

Read through "Problem 5: Subtracting Polynomials" on Page 489 of your textbook.
What are the two polynomials given? Write below.

There are two methods provided to perform subtraction of polynomials. Demonstrate how to use each method.

	Method 1	Method 2
Explain in words		
Demonstrate the math		
Check your preferred method		

Solve the Got It? #5. Write the problem, show your work as you solve, and circle your answer.

Finally, ensure you can explain this concept to your fellow group members. Think about how you can demonstrate the addition of polynomials. Be sure to include both methods. Do you think there are any misconceptions that should be noted? What should students look out for? Can you come up with a trick to remember a procedure?

Adding Polynomials

Read through "Problem 4: Adding Polynomials" on Page 488 of your textbook.
What are the two polynomials given? Write below.

There are two methods provided to perform addition of polynomials. Demonstrate how to use each method.

	Method 1	Method 2
Explain in words		
Demonstrate the math		
Check your preferred method		

Solve the Got It? #4. Write the problem, show your work as you solve, and circle your answer

Finally, ensure you can explain this concept to your fellow group members. Think about how you can demonstrate the addition of polynomials. Be sure to include both methods. Do you think there are any misconceptions that should be noted? What should students look out for? Can you come up with a trick to remember a procedure?

Algebra Chapter 8.1- Skeleton Notes

Review: Simplify each problem then state the exponent rule that supports your answer.

1. $x(x^4)$ x^5 Rule: When the same base is being multiplied, ADD the exponents.

2. $(x^4)^2$ x^8 Rule: Power of a Power, multiply the exponents.

Define the following vocabulary using the Glossary in your textbook, section 8.1 or your math notes. Then provide an example of each vocabulary term.

Factor- numbers or variables that are multiplied together resulting in a product	$2 \cdot 5 = 10$ or $x^2(x^3) = x^5$
Coefficient – numerical factor of a term	$2x$, $4abc$, $-7y$
Variable- represents an unknown value	x, y, z
Constant- a number by itself	2, $\frac{1}{2}$, 0.75, -4
Monomial- a #, variable or a product of a # and 1 or more variables with whole # exponents (also called a term)	4, y, $-3x^4$, $\frac{x}{7}$, $20x^3y^4$
Polynomial- a monomial or a sum of monomials	$4x+7$ (polynomial with 2 terms) $3x^2+7x+2$ (polynomial with 3 terms)
Binomial- a sum of exactly 2 terms	$5xy + 2y$
Trinomial- a sum of exactly 3 terms	$2x^2 + 7x + 2$

What is the difference between a term and a factor?

* Do NOT confuse the 2!
* Terms – separated by ⊕/⊖
* Factors are multiplied

$2x^4y$ + $7y$ + 18 → only a term

$2x^4y$: A term with 3 factors; $7y$: A term with 2 factors

Degree of a **monomial/term**: Sum of the exponents of its variables
Problem/Got its #1 A) $8xy$ (degree of term = 2; $x^1y^1 \Rightarrow 1+1=2$) B) $-7y^4z$ (degree of term = 5; $y^4z^1 \Rightarrow 4+1=5$) C) 11 (degree of term = 0; no variables $\Rightarrow 0$)

Degree of a **Polynomial**: highest degree of its terms

Polynomial	Terms	Degree of Term(s)	Degree of Polynomial
$5mn^2$	1 Term	3	3
$-4x^2y^2+3x^3+5$	3 Terms ($-4x^2y^2, 3x, 5$)	4, 2, 0	4
$3a+7ab-2a^2b+16+4a$	4 Terms ($7a, 7ab, -2a^2b, 16$)	1, 2, 3, 0	3

Why is it important to know the degree of each term and the degree of the polynomial?

* You can write the polynomial in the correct way & then classify the polynomial.
* Standard form - degree of its terms in decreasing order
  - if there are multiple variables in a term, always write them in alphabetical order

Classifying the Polynomial:

naming a polynomial based on its degree & # of terms

Degree of a Polynomial	Number of Terms in a Polynomial
Constant - a # by itself - a degree of zero 7 or $7x^0$	Monomial - 1 term
Linear - 1st degree - a straight line when graphed	Binomial - 2 terms
Quadratic - 2nd degree - parabola when graphed	Trinomial - 3 terms
Cubic - 3rd degree	Polynomial - 4 or more terms
4th degree	
x^{th} degree	

Problem/ Got its #3

A) $8x^2+2x-3$ (quadratic trinomial)

B) It allows you to see which monomial has the greatest degree & how many terms the polynomial has

8.1

Key

Adding Polynomials

Read through "Problem 4: Adding Polynomials" on Page 488 of your textbook.
What are the two polynomials given? Write below.

$-7.1x^2-180x+5800$ and $21x^2-140x+1900$

There are two methods provided to perform addition of polynomials. Demonstrate how to use each method.

	Method 1	Method 2
Explain in words	Add vertically. Line up like terms. Then add the coefficients.	Add horizontally. Group like terms. Then add the coefficients.
Demonstrate the math	$-7.1x^2-180x+5800$ $+\ 21x^2-140x+1900$ $13.9x^2-320x+7700$	$(-7.1x^2-180x+5800)+(21x^2-140x+1900)$ $(-7.1x^2+21x^2)+(-180x+-140x)+(5800+1900)$ $13.9x^2-320x+7700$
Check your preferred method		

* Remember like terms are the same variables @ the same power! (like terms can be +/-/x/÷ unlike terms can only be x/÷)

* You can use colors to help!

Solve the Got It? #4. Write the problem, show your work as you solve, and circle your answer.

$(-12x^3+106x^2-241x+4477)+(14x^2-14x+1545)$

$-12x^3+120x^2-255x+6022$

Finally, ensure you can explain this concept to your fellow group members. Think about how you can demonstrate the addition of polynomials. Be sure to include both methods. Do you think there are any misconceptions that should be noted? What should students look out for? Can you come up with a trick to remember a procedure?

Signs & staking like terms w/ Method 1

Key

8.1
Subtracting Polynomials

Read through "Problem 5: Subtracting Polynomials" on Page 489 of your textbook.
What are the two polynomials given? Write below.

x^3-3x^2+5x and $7x^3+5x^2-12$

There are two methods provided to perform subtraction of polynomials. Demonstrate how to use each method.

	Method 1	Method 2
Explain in words	Subtract vertically by lining up like terms. Then add the opposite of each term in the polynomial being subtracted.	Subtract horizontally by distributing the negative. Then combine like terms.
Demonstrate the math	x^3-3x^2+5x $-(7x^3+5x^2-12)$ x^3-3x^2+5x $-7x^3-5x^2+12$	$(x^3-3x^2+5x)-(7x^3+5x^2-12)$ $x^3-3x^2+5x-7x^3+5x^2-12$
Check your preferred method	$-6x^3-8x^2+5x+12$	$-6x^3-8x^2+5x+12$

WATCH THE SIGNS

Solve the Got It? #5. Write the problem, show your work as you solve, and circle your answer.

$(-4m^3-m+9)-(4m^2+m-12)$

$-4m^3-m+9-4m^2-m+12$

$-4m^3-4m^2-2m+21$

Finally, ensure you can explain this concept to your fellow group members. Think about how you can demonstrate the addition of polynomials. Be sure to include both methods. Do you think there are any misconceptions that should be noted? What should students look out for? Can you come up with a trick to remember a procedure?

SIGNS

* Forgetting to distribute a negative
* Thinking a negative & positive term are the same

Name _____ Class _____ Date _____

8-1 Practice

Form G

Adding and Subtracting Polynomials

Find the degree of each monomial.

1. $2b^2c^2$ **2.** $5x$ **3.** $7y^5$ **4.** $19ab$

5. 12 **6.** $\frac{1}{2}z^2$ **7.** t **8.** $4d^4e$

Simplify.

9. $2a^3b + 4a^3b$ **10.** $5x^3 - 4x^3$ **11.** $3m^6n^3 - 5m^6n^3$

12. $-6ab + 3ab$ **13.** $4c^2d^6 - 7c^2d^6$ **14.** $315x^2 - 30x^2$

Write each polynomial in standard form. Then name each polynomial based on its degree and number of terms.

15. $15x - x^3 + 3$ **16.** $5x + 2x^2 - x + 3x^4$ **17.** $9x^3$

18. $7b^2 + 4b$ **19.** $-3x^2 + 11 + 10x$ **20.** $12t^2 + 1 - 3x + 8 - 2x$

Simplify.

21.
$$\begin{array}{r} 8z - 12 \\ +\ 6z + 9 \\ \hline \end{array}$$

22.
$$\begin{array}{r} 9x^3 + 3 \\ +\ 4x^3 + 7 \\ \hline \end{array}$$

23.
$$\begin{array}{r} 6j^2 - 2j + 5 \\ +\ 3j^2 + 4j - 6 \\ \hline \end{array}$$

24. $(3k^2 + 5) + (16x^2 + 7)$ **25.** $(g^4 - 4g^2 + 11) + (-g^3 + 8g)$

26. A local deli kept track of the sandwiches it sold for three months. The polynomials below model the number of sandwiches sold, where s represents days.

Ham and Cheese: $4s^3 - 28s^2 + 33s + 250$

Pastrami: $-7.4s^2 + 32s + 180$

Write a polynomial that models the total number of these sandwiches that were sold.

Name _____ Class _____ Date _____

8-1 Practice (continued) Form G

Adding and Subtracting Polynomials

Simplify.

27. $11n - 4$ $-(5n + 2)$

28. $7x^4 + 9$ $-(8x^4 + 2)$

29. $3d^2 + 8d - 2$ $-(2d^2 - 7d + 6)$

30. $(28e^3 + 3e^2) + (19e^3 + e^2)$

31. $(-12h^4 + h) - (-6h^4 + 3h^2 - 4h)$

32. A small town wants to compare the number of students enrolled in public and private schools. The polynomials below show the enrollment for each:

Public School: $-19c^2 + 980c + 48{,}989$

Private School: $40c + 4046$

Write a polynomial for how many more students are enrolled in public school than private school.

Simplify. Write each answer in standard form.

33. $(3a^2 + a + 5) - (2a - 5)$

34. $(6d - 10d^3 + 3d^2) - (5d^3 + 3d - 4)$

35. $(-4s^3 + 2s - 3) + (-2s^2 + s + 7)$

36. $(8p^3 - 6p + 2p^2) + (9p^2 - 5p - 11)$

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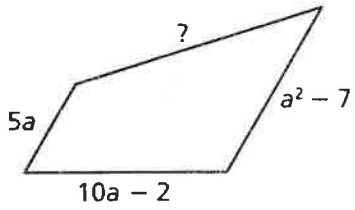
37. The fence around a quadrilateral-shaped pasture is $3a^2 + 15a + 9$ long. Three sides of the fence have the following lengths: $5a$, $10a - 2$, $a^2 - 7$. What is the length of the fourth side of the fence?



38. Error Analysis Describe and correct the error in simplifying the sum shown at the right.

$$\begin{array}{r} 6x^3 + 4x - 10 \\ +\ (-3x^2 + 2x + 8) \\ \hline 3x^3 + 6x - 2 \end{array}$$

39. Open-Ended Write three different examples of the sum of a quadratic trinomial and a cubic monomial.

Name Key Class _____ Date _____

8-1 Practice

Form G

Adding and Subtracting Polynomials

Find the degree of each monomial.

1. $2b^2c^2$ 4 (2+2)
2. $5x$ 1
3. $7y^5$ 5
4. $19db^1$ 2 (1+1)
5. 12 0
6. $\frac{1}{2}z^2$ 2
7. t 1
8. $4d^4e$ 5 (4+1)

Simplify.

9. $2a^3b + 4a^3b$ $6a^3b$
10. $5x^3 - 4x^3$ x^3
11. $3m^6n^3 - 5m^6n^3$ $-2m^6n^3$
12. $-6ab + 3ab$ $-3ab$
13. $4c^2d^6 - 7c^2d^6$ $-3c^2d^6$
14. $315x^2 - 30x^2$ $285x^2$

Write each polynomial in standard form. Then name each polynomial based on its degree and number of terms.

15. $15x - x^3 + 3$
$-x^3 + 15x + 3$; cubic trinomial
16. $5x + 2x^2 - x + 3x^4$
$3x^4 + 2x^2 + 4x$; fourth degree trinomial
17. $9x^3$
$9x^3$; cubic monomial
18. $7b^2 + 4b$
$7b^2 + 4b$; quadratic binomial
19. $-3x^2 + 11 + 10x$
$-3x^2 + 10x + 11$; quadratic trinomial
20. $12t^2 + 1 - 3x + 8 - 2x$
$12t^2 - 5x + 9$; quadratic trinomial

Simplify.

21. $8z - 12$
$+ 6z + 9$
$14z - 3$
22. $9x^3 + 3$
$+ 4x^3 + 7$
$13x^3 + 10$
23. $6j^2 - 2j + 5$
$+ 3j^2 + 4j - 6$
$9j^2 + 2j - 1$
24. $(3k^2 + 5) + (16x^2 + 7)$
$3k^2 + 16x^2 + 12$
25. $(g^4 - 4g^2 + 11) + (-g^3 + 8g)$
$g^4 - g^3 - 4g^2 + 8g + 11$
26. A local deli kept track of the sandwiches it sold for three months. The polynomials below model the number of sandwiches sold, where s represents days.

Ham and Cheese: $4s^3 - 28s^2 + 33s + 250$
Pastrami: $-7.4s^2 + 32s + 180$

Write a polynomial that models the total number of these sandwiches that were sold. $4s^3 - 35.4s^2 + 65s + 430$

Name _____ Class _____ Date _____

8-1 Practice (continued) Form G

Adding and Subtracting Polynomials

Simplify.

27. $\begin{array}{r} 11n - 4 \\ -(5n + 2) \\ \hline \end{array}$ $6n - 6$

28. $\begin{array}{r} 7x^4 + 9 \\ -(8x^4 + 2) \\ \hline \end{array}$ $-x^4 + 7$

29. $\begin{array}{r} 3d^2 + 8d - 2 \\ -(2d^2 - 7d + 6) \\ \hline \end{array}$ $d^2 + 15d - 8$

30. $(28e^3 + 3e^2) + (19e^3 + e^2)$ $47e^3 + 4e^2$

31. $(-12h^4 + h) - (-6h^4 + 3h^2 - 4h)$ $-6h^4 - 3h^2 + 5h$

32. A small town wants to compare the number of students enrolled in public and private schools. The polynomials below show the enrollment for each:

Public School: $-19c^2 + 980c + 48{,}989$
Private School: $40c + 4046$

Write a polynomial for how many more students are enrolled in public school than private school. $-19c^2 + 940c + 44{,}943$

Simplify. Write each answer in standard form.

33. $(3a^2 + a + 5) - (2a - 5)$ $3a^2 - a + 10$

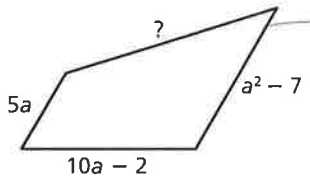
34. $(6d - 10d^3 + 3d^2) - (5d^3 + 3d - 4)$ $-15d^3 + 3d^2 + 3d + 4$

35. $(-4s^3 + 2s - 3) + (-2s^2 + s + 7)$ $-4s^3 - 2s^2 + 3s + 4$

36. $(8p^3 - 6p + 2p^2) + (9p^2 - 5p - 11)$ $8p^3 + 11p^2 - 11p - 11$

37. The fence around a quadrilateral-shaped pasture is $3a^2 + 15a + 9$ long. Three sides of the fence have the following lengths: $5a$, $10a - 2$, $a^2 - 7$. What is the length of the fourth side of the fence?

$2a^2 + 18$



38. **Error Analysis** Describe and correct the error in simplifying the sum shown at the right.

two unlike terms, $6x^3$ and $-3x^2$, were added;
$6x^3 - 3x^2 + 6x - 2$

$$\begin{array}{r} 6x^3 + 4x - 10 \\ +(-3x^2 + 2x + 8) \\ \hline 3x^3 + 6x - 2 \end{array}$$

39. **Open-Ended** Write three different examples of the sum of a quadratic trinomial and a cubic monomial.

Answers may vary. Sample: $(x^2 + 2x + 1) + x^3$; $(2x^2 + 5x + 6) + 3x^3$; $(r^2 + r + 1) + 8r^3$

$5a + 10a - 2 + a^2 - 7$
$(a^2 + 15a + -9) + ? =$
$2a^2 + 18$