Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ date: \_\_\_\_\_\_\_\_\_\_\_\_\_ period: \_\_\_\_\_\_\_

***COLLEGE PREP ~ CHAPTER 5A REVIEW (Sections “Prep for Chapter 5” – 5.3)***

***“Prep for Chapter 5” Section***

You should know:

* *The Laws of Exponents*

Zero Exponent Rule: $a^{0}=1 if a\ne 0$ Negative Exponent Rule: $a^{-n}=\frac{1}{a^{n}} if a\ne 0$

Product Rule: $a^{m}∙a^{n}=a^{m+n}$ Quotient Rule: $\frac{a^{m}}{a^{n}}=a^{m-n} if a\ne 0$

Power Rule: $\left(a^{m}\right)^{n}=a^{m∙n}$ Power of a Product Rule: $\left(a∙b\right)^{n}=a^{n}∙b^{n}$

Power of a Quotient: $\left(\frac{a}{b}\right)^{n}=\frac{a^{n}}{b^{n}} if b\ne 0$ Quotient to a Negative Power: $\left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^{n} if a,b\ne 0$

* How to convert decimal notation to Scientific Notation, and vice versa.
* Multiply and Divide values written in Scientific Notation.

***Simplify each of the following expressions.***

**1.** $\left(\frac{3}{4}\right)^{-3}$ **2.** $\left(-4\right)^{-5}∙\left(-4\right)^{3}$ **3.** $\left(5a^{2}\right)^{0}$

**4.** $\frac{1}{6^{-2}}$ **5**. $y^{4}∙y^{3}$ **6.** $\frac{5x^{3}}{15x^{5}}$

**7.** $\left(\frac{z}{4}\right)^{3} $ **8.** $\left(-5ab^{3}\right)\left(3a^{2}b\right)^{2}$ **9.** $\left(x^{4}\right)^{5}$

***Write each number in scientific notation.***

**10.** $94,000,000$ **11.** $0.000367$ **12.** $-5,670$

***Perform the indicated operation. Express your answer in scientific notation.***

**13**. $\left(1.8×10^{-7}\right)∙\left(3×10^{3}\right)$ **14.** $\frac{\left(8.2×10^{7}\right)}{\left(4.1×10^{4}\right)}$

***Sections 5.1/5.2 ~ Adding, Subtracting and Multiplying Polynomials***

You should know how to:

* Determine the degree of a polynomial (add the exponents of the terms, the highest sum is the degree).
* Determine if an expression is a polynomial (variables should have positive integer exponents).
* Determine if a polynomial is a monomial (one term), a binomial (two terms) or a trinomial (three terms).
* Simplify polynomials by combining like terms (addition and subtraction).
* Multiply polynomials (multiply coefficients, and add exponents on like variables). This includes multiplying a monomial by a polynomial (distribution), two binomials (distribution/FOIL), and polynomial by polynomial (repeated distribution).
* Evaluate polynomial functions.

***Determine the degree and coefficient of each monomial.***

**15.** $-7x^{4}$ **16.** $\frac{1}{9}w^{3}$ **17.** $3x^{2}y^{3}$

***Determine the degree of each polynomial and identify it as a binomial, trinomial, or polynomial.***

**18**. $7x^{3}-3x^{2}$ **19.** $3+2y-3y^{2}+y^{4}$ **20.** $16x^{4}y-3x^{2}y^{2}+2xy^{2}$

***Simplify each of the following. Be sure you pay attention to whether you are supposed to add, subtract, or multiply!***

**21.** $\left(x^{2}+2x-7\right)+\left(3x^{2}-4-x\right)$ **22**. $\left(a^{2}b-4ab^{2}+3\right)-\left(2a^{2}b+2ab^{2}-7\right)$

**23.** $\left(-3x^{3}y\right)\left(4xy^{2}\right)$ **24.** $5ab\left(-2a^{2}b+ab^{2}-3ab\right)$

**25**. $\left(x+2\right)\left(x-9\right)$ **26**. $ \left(4x^{3}-3x^{2}+x-5\right)-\left(x^{4}+2x^{2}-7x+1\right)$

**27**. $\left(x+2\right)\left(3x^{2}-5x+1\right)$ **28**. $\left(6k-5\right)^{2}$

**29**. $\left(m^{2}-2m+3\right)\left(2m^{2}+5m-7\right)$ **30**. $\left(2x-5y\right)\left(2x+5y\right)$

***Find the indicated function or function value.***

**31**. $f\left(x\right)=-3x^{2}+2x-8$ **32.** $f\left(x\right)=4x-3, g\left(x\right)=x^{2}+3x+2$

 a) $f\left(-2\right)=$ a) $\left(f+g\right)\left(x\right)=$

 b) $f\left(3\right)=$ b) $\left(f-g\right)\left(x\right)=$

**33**. $f\left(x\right)=3x-7, g\left(x\right)=6x+5$ **34.** Find $f\left(x-3\right) when f\left(x\right)=5x^{2}+8$

 a) $\left(f∙g\right)\left(x\right)=$

 b) $\left(f∙g\right)\left(-2\right)=$

***Section 5.4 ~ Division of Polynomials and Synthetic Division***

You should know how to:

* Divide a polynomial by a monomial (split it up and divide each piece.)
* Divide polynomials using long division.
* Divide polynomials using synthetic division (for the special case when the divisor is in the form $x-c$.)
* Divide polynomial functions (Replace function names with polynomials and divide).
* Use the Remainder theorem and the Factor theorem.

***Divide the following problems. Use whatever method you would like.***

**35.** $\frac{12x^{3}-6x^{2}}{3x}$ **36.** $\frac{2m^{3}n^{2}+ 8m^{2}n^{2}-14mn^{3}}{4m^{2}n^{3}}$

**37.** $\frac{6z^{3}+9z^{2}+4z-6}{2z+3}$ **38.** $\frac{16x^{4}-81}{2x-3}$

**39**. $\frac{5x^{2}+11x+8}{x+2}$ **40.** $\frac{n^{3}+2n^{2}-39n+67}{n-4}$

**41**. Find $\left(\frac{f}{g}\right)\left(x\right)$ if $f\left(x\right)=5x^{3}+25x^{2}-15x and g\left(x\right)=5x$

**42.** Use the Remainder Theorem to find the remainder if $f\left(x\right)=4x^{2}-7x+23$ is divided by $x-4$.

**College Prep Chapter 5A Review Key:**

1. $\frac{64}{27}$ 2. $\frac{1}{16}$ 3. $1$ 4. $36$ 5. $y^{7}$ 6. $\frac{1}{3x^{2}}$ 7. $\frac{z^{3}}{64}$

8. $-45a^{5}b^{5}$ 9. $x^{20}$ 10. $9.4×10^{7}$ 11. $3.67×10^{-4}$ 12. $-5.67×10^{3}$

13. $5.4×10^{-4}$ 14. $2.0×10^{3}$ 15. Degree is 4, coefficient is -7 16. Degree is 3, coefficient is 1/9

17. degree is 5, coefficient is 3 18. 3 19. 4 20. 5 21. $4x^{2}+x-11$ 22. $-a^{2}b-6ab^{2}+10$

23. $-12x^{4}y^{3}$ 24. $-10a^{3}b^{2}+5a^{2}b^{3}-15a^{2}b^{2}$ 25. $x^{2}-7x-18$ 26. $-x^{4}+4x^{3}-5x^{2}+8x-6$

27. $3x^{3}+x^{2}-9x+2$ 28. $36k^{2}-60k+25$ 29. $2m^{4}+m^{3}-11m^{2}+29m+21$

30. $4x^{2}-25y^{2}$ 31.a) -24 b) -29 32.a) $x^{2}+7x-1$ b) $-x^{2}-x+5$

33. a) $18x^{2}-27x-35$ 33.b) 91 34. $5x^{2}-30x+53$ 35. $4x^{2}-2x$

36. $\frac{m}{2n}+\frac{2}{n}-\frac{7}{2m}$ 37. $3z^{2}+2-\frac{12}{2z+3}$ 38. $8x^{3}+12x^{2}+18x+27$ 39. $5x+1+\frac{6}{x+2}$

40. $n^{2}+6n-15+\frac{7}{n-4}$ 41. $x^{2}+5x-3$ 42. 59

**College Prep Chapter 5A Review Key:**

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