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

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

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

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

- 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.** $(-4)^{-5} \cdot (-4)^3$ **3.** $(5a^2)^0$

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

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

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. $(1.8 \times 10^{-7}) \cdot (3 \times 10^3)$ **14.** $\frac{(8.2 \times 10^7)}{(4.1 \times 10^4)}$

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.** $3x^2y^3$

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.** $16x^4y - 3x^2y^2 + 2xy^2$

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

21. $(x^2 + 2x - 7) + (3x^2 - 4 - x)$ **22**. $(a^2b - 4ab^2 + 3) - (2a^2b + 2ab^2 - 7)$

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

25. $(x + 2)(x - 9)$ **26**. $(4x^3 - 3x^2 + x - 5) - (x^4 + 2x^2 - 7x + 1)$

27. $(x+2)(3x^2-5x+1)$

28. $(6k-5)^2$

29. $(m^2-2m+3)(2m^2+5m-7)$

30. $(2x-5y)(2x+5y)$

Find the indicated function or function value.

31. $f(x)=-3x^2+2x-8$

a) $f(-2)=$

b) $f(3)=$

32. $f(x)=4x-3,\ g(x)=x^2+3x+2$

a) $(f+g)(x)=$

b) $(f-g)(x)=$

33. $f(x)=3x-7,\ g(x)=6x+5$

a) $(f\cdot g)(x)=$

b) $(f\cdot g)(-2)=$

34. Find $f(x-3)\ when\ f(x)=5x^2+8$

Section 5.3 ~ 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. $\frac{2m^3n^2+8m^2n^2-14mn^3}{4m^2n^3}$

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

42. Use the Remainder Theorem to find the remainder if $f(x) = 4x^2 - 7x + 23$ 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. $-45a^5b^5$ 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. $-a^2b - 6ab^2 + 10$

23. $-12x^4y^3$ 24. $-10a^3b^2 + 5a^2b^3 - 15a^2b^2$ 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

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