**Pre-College Math S2 Review Packet Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Study Guide:* *Be sure you are able to do problems in each topic below*

**Unit 4:**

* Solve systems by graphing
* Solve systems by substitution
* Solve systems by elimination method (or addition method)
* Solve systems of inequalities by graphing a shaded region

**Unit 5:**

* Apply exponent rules to simplify expressions
* Use scientific notation
* Add & subtract polynomial expressions
* Multiply polynomial expressions (by distributing and by using FOIL)

**Unit 6:**

* Factor by using GCF
* Factor trinomials
* Factor using special patterns (difference of perfect squares pattern)

**Pascal’s Triangle:**

* Recognize patterns in Pascal’s triangle
* Find the sum of the elements in any row (using a formula)
* Write binomial expansions using Pascal’s triangle

**Fractals, Tesselations, Fibonacci Sequence, Golden Ratio:**

* Find any number in the Fibonacci Sequence (not just up to 13)
* Know and apply the Golden Ratio

**Sem2 Review #1**

**For #1 – 15: Simplify the expressions. Write the answers in exponential form using positive exponents.**

1) 52∙59  2) (-3)12(-3)4 3) $\left(-5x^{5}\right)\left(2x^{4}\right)\left(x^{8}\right)$

4) $\left(-8x^{3}y^{5}\right)^{2}$ 5) $6rt^{3}\left(-2rt\right)^{3}$ 6) $\left(4x^{3}y^{4}\right)^{2}\left(-2xy^{9}\right)^{3}$

7) $\left(\frac{9a^{5}b^{2}}{7c^{3}}\right)^{2}$ 8) $-\left(36a^{3}b^{22}c^{-15}\right)^{0}$ 9) -5-2

10) (-5)-2 11) $\left(\frac{3}{4}\right)^{-2}$ 12) $\left(4b^{-7}\right)^{-3}$

13) $\left(-11\right)^{0}$ 14) $\left(2m\right)^{3}(3m^{-3})$ 15) $\frac{\left(5c^{2}\right)^{2}c^{-8}}{\left(c^{6}\right)^{-2}} $

**For #16 – 18:** Simplify the expressions. Write your answers in descending powers of the variable. \

16) $-5y^{5}+ 8y^{4} – 2y^{5}+ 3y^{4}+8y$

17) $(6x^{2} – 9x –7) + (4x^{2}+ x +3)$

18) $(2x^{2} – 3x –7) – (2x^{2}+x+8)$

19) Simplify: $ (8x^{3}y^{2} –3xy^{5} +2x^{2}) – (-9x^{2} – x^{3}y^{2} + 2xy^{5})$

**For #20 – 21:** Write each number in scientific notation.

20) 2,208,000,000

21) 0.00000000702

**For #22 – 23:** Write each number without exponents.

22) 3.08 x 105

23) 2.5 x 10-5

24) A successful company sold $62,000,000,000 of technology last year. Write this value in scientific notation.

25) Divide: $\frac{10.5×10^{-3}}{5×10^{7}}$

26) Multiply: $(3×10^{5})(4×10^{19})$

**For #27 – 33:** Find each product.

27) $-3x^{2}(4x^{2} – 2x- 7)$ 28) $(a – 8)(a + 2)$

29) $ (x – 5)(x^{2} – 4x- 3)$ 30) $(3a – 7b)(3a + 7b)$

31) $\left(3x – 1\right)^{2}$ 32) Multiply: $\left(a + 2b\right)^{3}$

33) Multiply: $6r(r – 1)(r – 7)$

**Sem2 Review #2**

**For #1 – 12:** Factor each polynomial. If it cannot be factored, write “prime.”

1) $x^{2}+2x-15$ 2) $n^{2}+12n+36$ 3) $25a^{2}-9b^{2}$

4) $20w^{4}-6w^{3} $ 5) $8x^{2}+48x+72$ 6) $16z^{2}-4y^{2}$

7) $4q^{2}+9r^{2}$ 8) $49x^{2}-14x+1$ 9) $18k^{3}-21k^{2}-15k$

10) $36x-48x^{2}$ 11) $4x^{4}+16x^{3}$ 12) $x^{2}-6xy+5y^{2}$

13) Simplify: $\frac{\left(-3x^{3}y\right)^{2}}{\left(-2xy^{4}\right)^{3}}$ 14) Simplify: $\left(5x-3y\right)^{2}$

15) Simplify: $\left(-\frac{3}{5}\right)^{2}$ 16) Simplify: $\left(\frac{7}{8}\right)^{-1}$

17) Simplify: $\left(\frac{2}{3}\right)^{-3}$ 18) Simplify: $\left(-14x^{-3}y^{5}\right)^{0}$

19) Factor $2x^{2}-7x-15$

 A. $(2x-5)(x+3)$ B. $(2x-7)(x-15)$ C. $(2x+3)(x-5)$ D. $(2x-1)(x+7)$

20) Factor $12x^{2}+7x-10$

 A. $(3x-10)(2x+1)$ B. $(2x-7)(6x-5)$ C. $(2x+2)(6x-5)$ D. $(3x-2)(4x+5)$

**Sem2 Review #3**

1. Is the ordered pair (-2, -9) a solution to the following system? $\left\{\begin{array}{c}y=3x-3\\y= -x+5\end{array}\right.$

**For the following systems, solve by any method. (Graphs are provided if needed)**

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2. $\left\{\begin{array}{c}4x+2y=4\\x-2y=6\end{array}\right.$

**3. $\left\{\begin{array}{c}6x-3y=12\\6x-3y=-6\end{array}\right.$

**4. $\left\{\begin{array}{c}x=-2y-2\\3x+4y=6\end{array}\right.$

**For the following systems, solve by any method. (Graphs are provided if needed)**

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 5. $\left\{\begin{array}{c}3x – 2y = -7\\2x + 3y = 17\end{array}\right.$

**** 6. $\left\{\begin{array}{c}12x-3y = 6\\-y + 4x = 2\end{array}\right.$

**For #7-9, solve the systems of inequalities by graphing**

**7.** $\left\{\begin{array}{c}x+y<2\\x\geq -2\\y\leq 4\end{array}\right.$

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|  8**.** $\left\{\begin{array}{c}y>2x-3\\y\leq -3x+2\end{array}\right.$**14 by 14 axes** | 9. $\left\{\begin{array}{c}2x-4y\geq 8\\y\geq \frac{1}{2}x+1\end{array}\right.$**14 by 14 axes** |

**10)** At an ice cream shop, one customer pays $7 for 2 sundaes and 2 milkshakes. A second customer pays $11 for 2 sundaes and 4 milkshakes. How much does one sundae cost? How much does one milkshake cost?

**11)** Jonathan, a second grader, counted the money in his piggy bank. He had only quarters and dimes. When he added up his money, he had 39 coins worth a total of $7.50. How many coins of each kind did he have?