Summer Work Packet for MPH Math Classes

Students going into
Algebra II/Trig AC

Sept. 2017

Name: _____

This packet is designed to help students stay current with their math skills.

Each math class expects a certain level of number sense, algebra sense and graph sense in order to be successful in the course.

These problems need to be completed on the space provided by the packet by the first day of class. Be sure to show all work.

Students can expect this packet to be graded and handed-in on the first day of school. If you have any questions, please email Mrs. Reeve at sreeve@mphschool.org or Mrs. Meehan at dmeehan@mphschool.org.

You will need a TI-84 or TI-84^{+} calculator for this class.

Name _____

Show all work! Do **NOT round** any answers. Write the answers as a **fraction** if the **decimal is repeating** or the **calculator does not show the whole decimal**. **Show all work on the packet**.

I. Order of Operations: We will use this all year long.
Grouping (parentheses), **E**xponents, **M**ultiplication/**D**ivision, then **A**ddition/**S**ubtraction, all from left to right.

$36 - 5^2 \cdot 2 + 7$

$$\frac{2(7-10)^2}{4^3 + (-3)^3}$$

II. Solving equations and inequalities for a variable and checking: Please show your steps and give the exact answer. Show your check for the first three problems**.**

$4(-3x+1) = -10(x-4) - 14x$ check

$\frac{3}{4}(\frac{4}{5}x - 2) = \frac{11}{4}$ check

$3(x+2) - 1.5x = 5.2(x-4)$ check

III. Solve the following inequality:

$-8 < \frac{2}{3}x - 4 < 10$

IV. We will be working with fractions all year long. Please do the following problems without a calculator. Show each step.

$\frac{7}{9} + \frac{5}{12}$

$\frac{17}{6} - \frac{15}{18}$

$4\frac{2}{7} \times 8\frac{4}{5}$

$3\frac{2}{5} \div 9\frac{4}{15}$

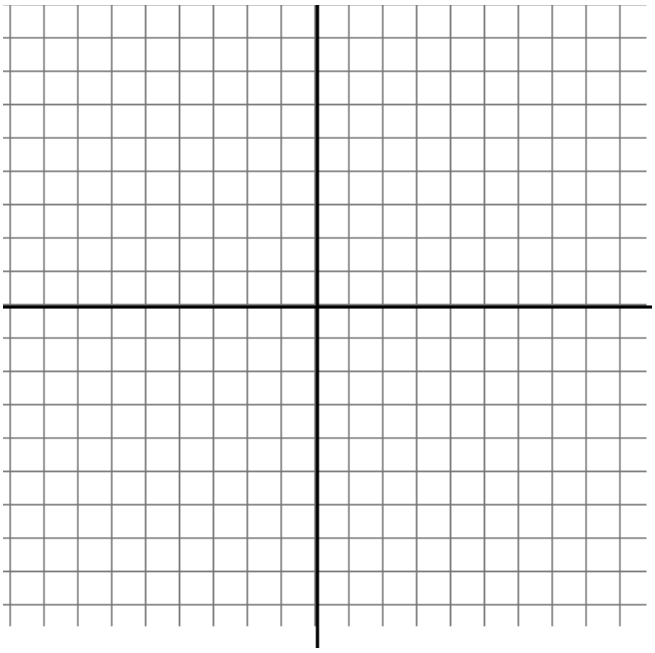
V. Absolute Values equations.

We will be discussing new concepts and writing about them in Algebra II /Trig AC. Please discuss the types of answers you would get and why for the following equation and make sure you use the definition of <u>absolute value</u> in your answer.

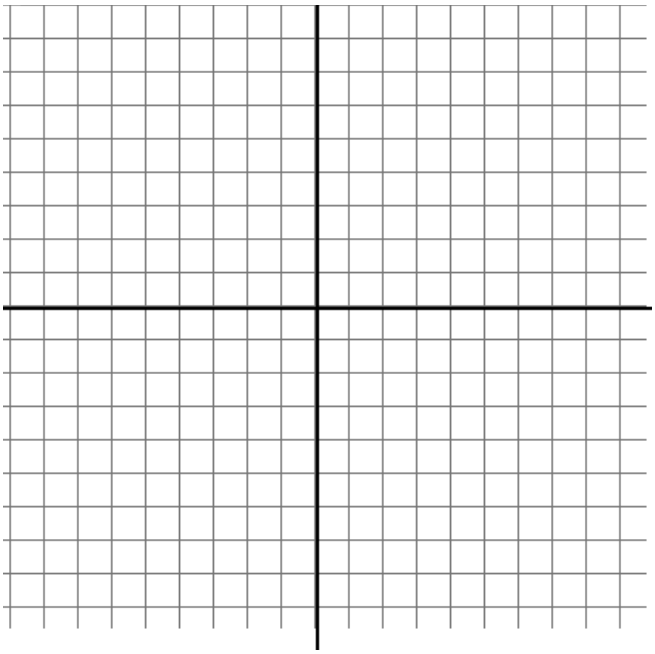
$|2x-6|=10$

VI. Linear functions: Rewrite each function in slope-intercept form (y = mx + b). Graph each function on the graph using at least three points, including the x and y - intercepts. Label each line and the points.

$2x+3y=12$



$x-4y=-8$



VII. When you have two different linear functions and you are asked to solve them, you are looking for the point, (x, y), where they intersect.

Solve the following system of equations using the substitution or elimination method and state the point where they intersect. Check your solutions.

$y = 4x - 5$
$-3x - y = -16$

Check:

$y - 2x = 3$
$-5x - y = -7$

Check:

VI. Quadratics and factoring: A quadratic function is defined as an equation in the form of $y = ax^2 + bx + c$. To solve an equation in this form you find its roots or zeros. You need to factor it or use the quadratic formula, which is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Solve the following quadratic equations by trying to factor first. If that does not work, use the quadratic formula. List your answers as x= the number(s).

$x^2 - 3x - 4 = 0$

$x^2 - 25 = 0$

$x^2 - 10x - 24 = 0$

$x^2 - 16x + 64 = 0$

$8x^2 - 4x = 0$

$9x^2 - 4 = 0$

$x^2 + 10x + 25 = 0$

$x^2 - 2x = 0$

$4x^2 - 81 = 0$

$3x^2 - 8x + 4 = 0$

$8x^2 - 28x - 60 = 0$

$20x^2 - 7x - 6 = 0$

VII. Simplifying algebraic expressions with exponents: Use only positive exponents in your answer and simplify completely.

$x^4(x^3 \times x^2)^2$

$(a^{-2}b^3c^{-4})^2(ab)^3$

$(12xyz)(2x^5y^{12}z^7)$

$\frac{3xyz}{4x^6y^{-2}z^9} \cdot \frac{12x}{9yz}$

VIII. Simplify the following radicals. Make sure that all radicals are completely reduced and that you do not have any radicals in the denominator. Leave your answer in radical form.

$\sqrt{144}$

$\sqrt{75}$

$\frac{\sqrt{72}}{\sqrt{8}}$

$\frac{3}{4}\sqrt{200}$

$\frac{\sqrt{96}}{\sqrt{4}}$

$\sqrt{32} \times \sqrt{125}$

THE NUMBER DEVIL
Composition Question
Seventh Night

For the following composition question, you may need to go back to the seventh chapter of THE NUMBER DEVIL.

Feel free to work with other people in the class, but each individual person must hand in his/her own essay written in his/her own words. Please write down who you worked with (if anyone) at the end of the paper. Feel free to use a calculator or spreadsheet.

Instructions to the composition question:

- Introduction: Introduce the problem by rephrasing the problem for a reader unfamiliar with it.

- Body: Answer the following questions. Support your statements. Explain your work. An example of supporting your statement is to explain how you used your calculator and then how you interpreted the results.

  -Color in multiples of 3 on the first number triangle, just as Robert and the number devil did on the seventh night. Then, color in multiples of 4 on the second number triangle and multiples of 7 on the third number triangle.

  -Do any of the number triangles you've colored in have a pattern? If yes, describe it. If no, explain why there is no pattern. Feel free to expand the number triangles if you need to.

  -Expand the following. SHOW YOUR WORK. Check your answers on the last page when you are finished:

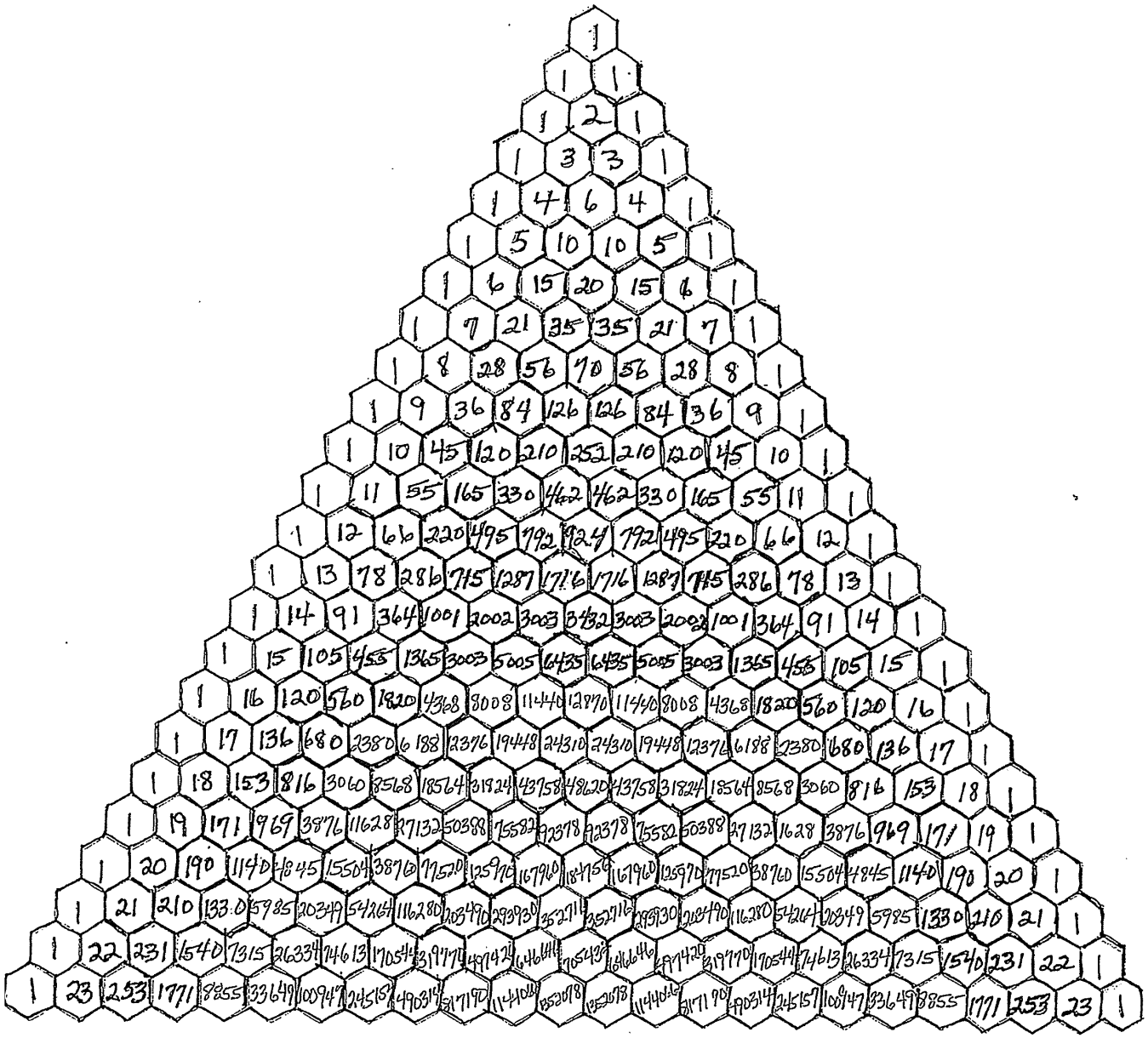
  $$(a+b)^0 \quad (a+b)^1 \quad (a+b)^2 \quad (a+b)^3 \quad (a+b)^4 \quad (a+b)^5 \quad (a+b)^6$$

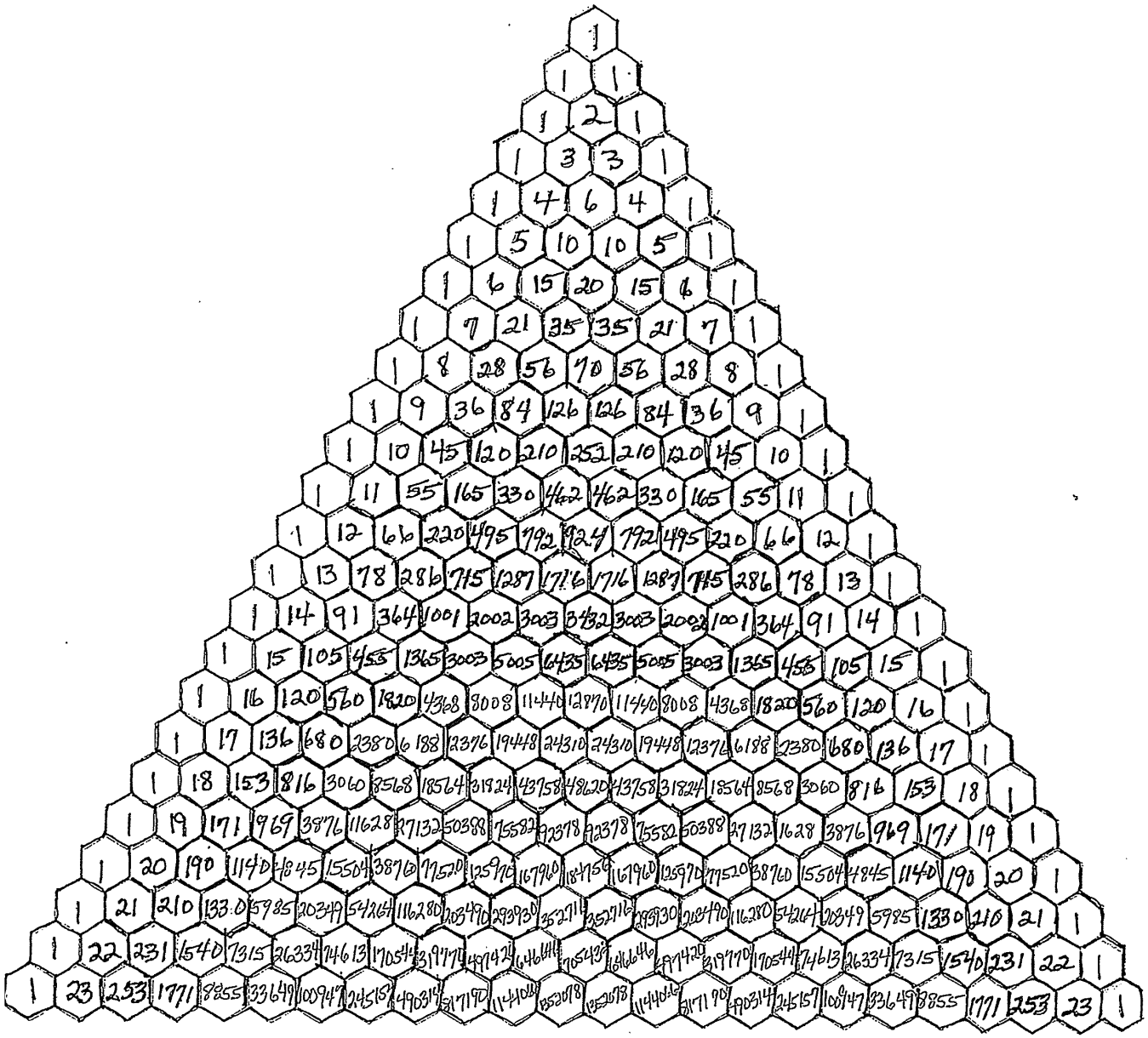
  -Compare your answers to the number triangle. How does the number triangle relate to these binomial expressions?

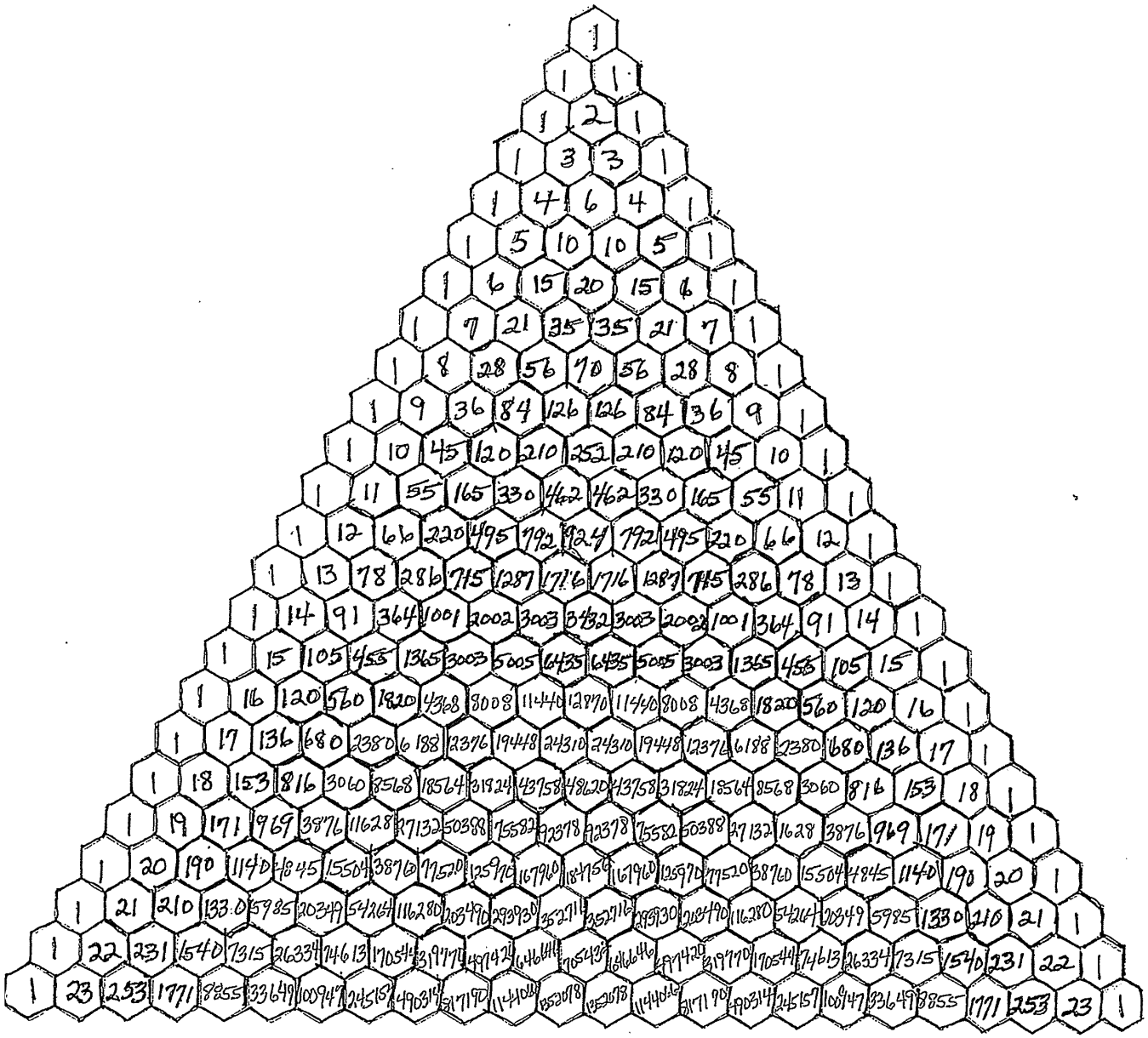
  -Using what you have discovered, write the expanded form of each of the following without doing the actually multiplication. $(a+b)^9$ $(a+b)^{10}$

  -Write a description of how to write the product of a binomial raised to any whole number power, without doing the multiplication.

- Conclusion: BRIEFLY restate and summarize your results. Remember to mention MAIN points. Mention other questions that could be considered with relation to this problem.







Answers:

$(a + b)^0 = 1$ $(a + b)^1 = a + b$ $(a + b)^2 = a^2 + 2ab + b^2$

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ $(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

$(a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

$(a + b)^6 = a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6$

ENJOY YOUR SUMMER, SEE YOU IN THE FALL!