



Summer Math Work for Students Entering Pre-Calculus Honors

We hope you are enjoying your summer but are also thinking about how to have a great school year next year.

The attached problem set is intended to address Algebra 2 topics needed for success. **All students are required to complete the problem set to be turned in to their teacher as a homework assignment when returning to school in the fall.**

This is the "summer reading" for your mathematics course. Be sure to show your work clearly in completing the problems.

If you find that there are specific topics that you need to review in more depth, you may want to spend some time doing so. Please consider this in planning your time to work. ***We will not be reviewing these topics further once the year has started, rather you are expected to be able to apply these concepts and techniques from day 1 of the school year.***

You are welcome to receive help on any of the problems or topics covered. Indeed, if you have difficulty, we encourage you to work with a parent, older sibling, friend, or teacher so that you master each topic. You may consult a textbook or online resource if you wish as you work through the problems. **Be sure, however, to show all your work, and that you understand all the work you present. Note that you will have a graded classroom test on this material shortly after the start of school in September.**

We do not expect this packet to be a burden for you. However, we know that reviewing these topics will put you in a much better position to succeed.

Best wishes for a happy rest of the summer.

The work in this packet was completed independently by my daughter.

Parent Signature _____

Part 1: Factoring and Quadratics

Factor Completely

1. $b^2 - 19b + 9$

2. $4n^2 - 8n - 252$

3. $15x^2 + 57x - 90$

4. $16x^3 - 6x^2 - 8x + 3$

5. $4x^3 + 8x^2 + 7x + 14$

Solve the following:

6. $4x^2 - 1 = 0$

7. $9r^2 - 25 = 0$

8. $100n^2 - 16 = 0$

9. $4x^2 + 32x + 64 = 0$

10. $27x^3 + 125 = 0$

Quadratic Application Problems:

1. The function $y = -0.03(x - 14)^2 + 6$ models the jump of a red kangaroo where x is the horizontal distance (in feet) and y is the corresponding height (in feet). What is the kangaroo's maximum height? How long is the kangaroo's jump?

2. A group of students built a model rocket and launched it from ground level. The starting velocity was 96 feet per second. The path the rocket took is modeled by the equation $h(t) = -16t^2 + vt + s$ where h is the height of the object in feet, t is the time it takes the object to rise or fall, v is the starting velocity in feet per second, and s is the starting height in feet.
 - a. What is the maximum height of the rocket and when did the rocket reach its maximum height?

 - b. After how many seconds was the rocket at an altitude of 128 feet?

 - c. How long does the flight of the rocket last?

Part 2: Systems of Equations

1. Use a calculator to solve the following: The total fare for two adults and three children on an excursion boat is \$14. If each child's fare is one-half of each adult's fare, what is the total cost for one adult and one child.

- A. \$4.00
- B. \$5.25
- C. \$6.00
- D. \$6.50

2. Do not use a calculator to solve the following:

If $10a = 6b + 7$ and $a - 6b = 34$, then what is the value of $-\frac{1}{3}a$?

- A. -1
- B. 1
- C. $\frac{41}{27}$
- D. $\frac{41}{9}$

3. What does the solution to a system of equations represent graphically?

4. What does it mean when a solution to a system of equations is:

- a. "No solution"
- b. "Infinitely many solutions"

Part 3: Exponent Rules

Simplify. Your answers should contain only positive exponents.

1. $(x^{-2}x^{-3})^4$

2. $(2v)^2 \cdot 2v^2$

3. $\frac{2y^3 \cdot 3xy^3}{3x^2y^4}$

4. $x^4y^3(2y^2)^0$

5. $\frac{(2x^3z^2)^3}{x^3y^4z^2 \cdot x^{-4}z^3}$

6. $\frac{(2pm^{-1}q^0)^{-4} \cdot 2m^{-1}p^3}{2pq^2}$

Part 4: Fractions

Evaluate each expression.

1. $\left(-\frac{10}{7}\right) + \frac{1}{6}$

2. $\left(-\frac{4}{3}\right) - \left(-\frac{3}{2}\right)$

3. $\left(-2\frac{5}{6}\right) - \left(-1\frac{1}{4}\right)$