Name _____

Advanced Algebra Summer Work Packet

Dear Advanced Algebra Students,

This is the Advanced Algebra Summer Packet. It is important that you review some essential algebraic concepts before starting the Advanced Algebra course. This packet is designed to help you with that review. Please complete these problems, showing all of your work to support your answers. If necessary, you can use loose leaf paper to show your work and staple it to the packet. Write your final answer in the spaces provided in this packet.

Your Summer Packet is due on Friday, September 6, 2024 and closes on Friday, September 13, 2024. It will be worth one summative grade (summative assignments make up 80% of your grade). It is always great to start a course with a good grade, so invest some time and energy during this vacation to prepare for an exciting year of Advanced Algebra.
If you need a refresher on how to solve certain types of problems, look for "key words" next to the to 🔍 help you do an online search for help on various topics.

Have an enjoyable, relaxing summer vacation! I'm looking forward to seeing you during the next school year!
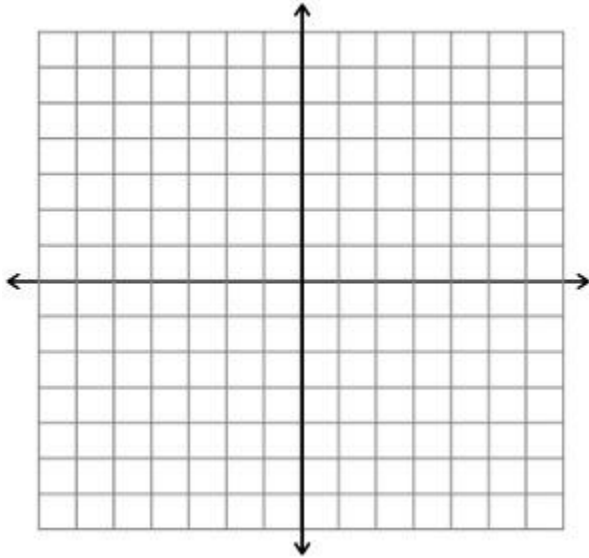
Sincerely,

Mr. David
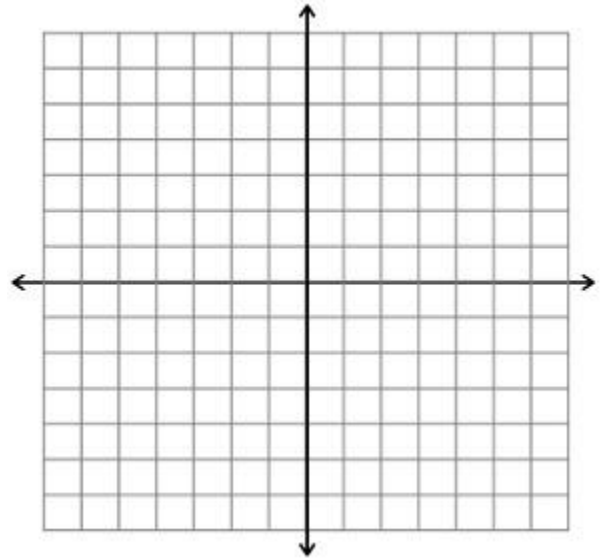
Advanced Algebra Summer Work Packet

Part I - Graph the following equations/inequalities.

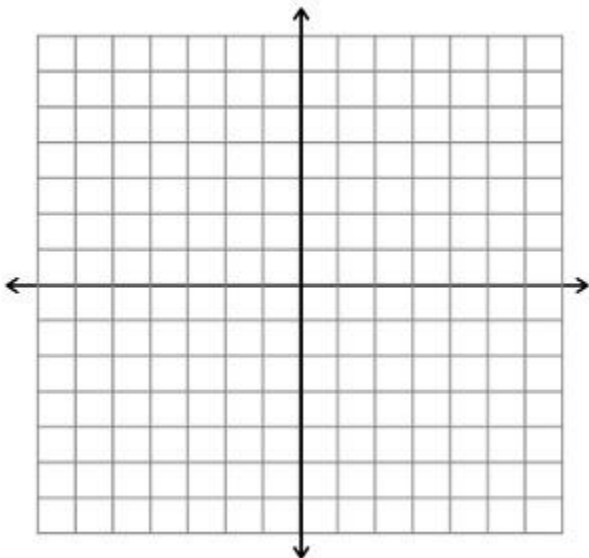🔍 **Key Words**: Graphing linear equations; Graphing quadratic equations; Graphing inequalities

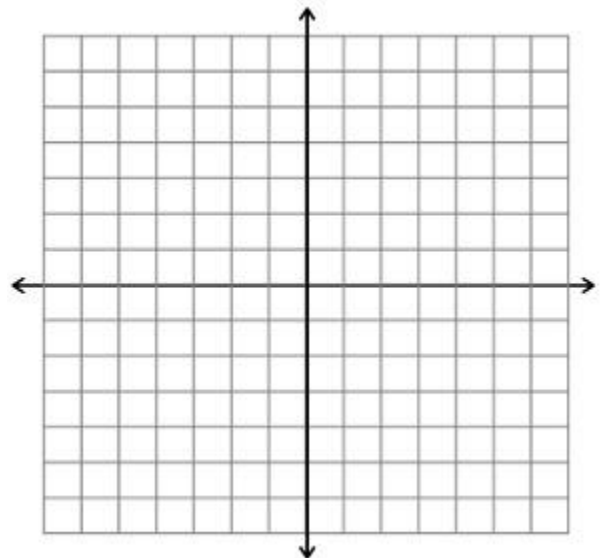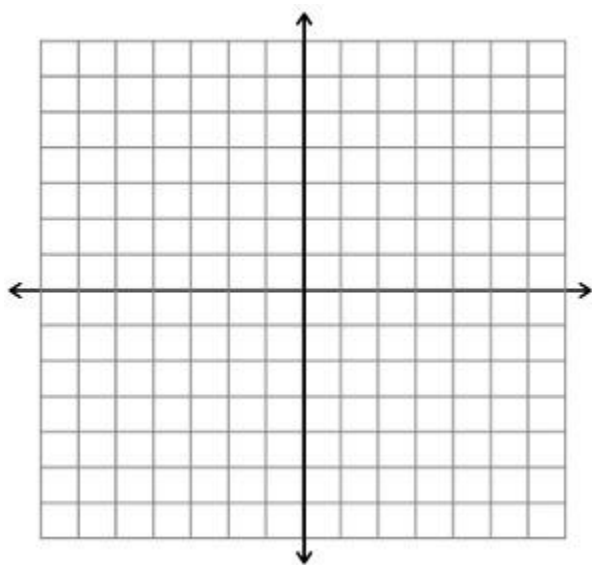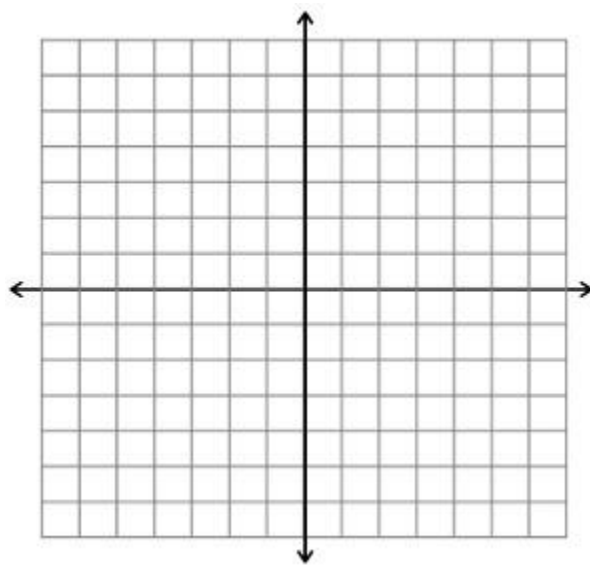|	
1. $3x + 4y = 12$	2. $x = -2$ and $y = 4$
3. $6x + 12y \leq -24$	4. $-4x + 2y = 10$

5. $6 < 3x + 3y$

6. What is the point that these two lines intersect? $2x - y = 6$ and $x + 2y = -2$

Part II - Determine whether the following two lines are parallel, perpendicular, or neither. **Explain your reasoning.**

🔍 **Key Words**: Writing linear equations; parallel and perpendicular lines

7. $2x - 4y = 16$ and $6x + 3y = -4$

Part III - Find the distance and midpoint between the two points.

🔍 **Key Words**: Distance and midpoint formulas

8. $(-4, -2)$ and $(1, -5)$ Distance: _____   Midpoint: _____

Part IV - Simplify the following use the laws of exponents.

🔍 **Key Words**: Simplifying exponent expressions; Law of exponents

9. $\left(-6x^3y^4\right)^{-2}$

10. $\dfrac{4x^4y^7}{8x^5y^3}$

11. $\left(\dfrac{3c^3d^4}{5}\right)^3$

12. $\dfrac{12x^{-3}y^{-5}}{3x^{-6}y^4}$

13. $5^5 \cdot 5^0 \cdot 5^{-3}$

14. $\dfrac{x^{10}}{3y^4} \cdot \dfrac{9x^2y^2}{x^4y^3}$

Part V - Simplify the following polynomial expressions.

🔍 **Key Words**: Simplifying polynomials; adding, subtracting, multiplying polynomials

15. $(2x^2 + 6x + 3) + (3x^2 + 4x - 4)$

16. $(6x^3 - 7x^4 + 10x) - (4x^3 - 6x^2 + 2x - 3)$

17. $(2x + 7)(x - 5)$

18. $(2x - 3)^2$

19. $(3x - 2)^3$

20. $(4x + 3)(x^2 - 2x + 5)$

Part VI - Solve the following equations and inequalities.

🔍 **Key Words**: Solving equations; solving inequalities

21. $-5(2x - 1) = 3(x + 4)$

22. $-6 \leq 3x + 2 \leq 11$

Part VII - Solve the following word problems.

🔍 **Key Words**: Solving linear and quadratic word problems

23. You pay $38.50 for a sweater that is marked 30% off the regular price. What is the regular price of the sweater? How much did you save by buying it on sale?

24. A candy factory needs a box that has a volume of 30 cubic inches. The width should be 2 inches less than the height and the length should be 5 inches greater than the height. What should the dimensions of the box be?

25. Last year the volleyball team bought pairs of socks for $5 per pair and shorts for $17 per pair. They spent $315. This year, socks are $6 per pair and shorts are $18 per pair. The same number of socks and shorts now cost $342. Use a system of two equations to determine how many pairs of each item were purchased.

26. The sum of two numbers is 12. The difference of the same two numbers is -4. Find the two numbers.