



Rock Ridge High School

43460 Loudoun Reserve Drive

Ashburn, VA 20148

P: 571-367-4100 F: 571-252-1636

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Dear Math Analysis Student,

Welcome to Math Analysis! We know you will find it rewarding and a great way to spend next year. As you already know, Math Analysis is a combination of Advanced Algebra/Precalculus in the first semester and Calculus AB in the second semester. Problem sets will be assigned each marking period in order to help you review concepts and skills which you have previously learned but which need periodic refreshing. While this summer assignment is not a formal “packet” for you to complete over the summer, it will help refresh some extremely important concepts and skills. Please be advised that these skills and concepts will be essential for you to have mastery of as you begin the course.

Calculus is intended for serious math students who plan to take higher-level mathematics and/or science courses in college. The curriculum, pace, and rigor of the AP Calculus courses are determined by the College Board guidelines. The AP Calculus course requires you to think mathematically, something some of you may never have done before. Do **not** be discouraged in the beginning if it takes you awhile to think mathematically. Throughout the course, we will Verbally NAG you. Verbally NAG is a way to remember the four ways that the College Board expects you to think mathematically.

Verbally – through written words and thoughts spoken out loud

Numerical – being able to understand charts, tables, etc and use them to answer questions

Algebraic – solving equations and word problems using algebra skills

Graphical –comprehending and interpreting graphs and using them to answer questions

Feel free to contact us with any questions or concerns that you may have. If you do not already own a graphing calculator, you should plan to obtain one and be familiar with the menus on your particular calculator. We recommend the TI-84 series calculator but any graphing calculator that is similar will do. Please remember that this packet is for you to use to practice prerequisite skills only. It will not be collected or graded in any way so just use it to keep up your math skills as you get ready to tackle a great math class in the fall!

This packet emphasizes the key algebra skills required to be successful in Advanced Algebra/Pre-Calculus/Math Analysis and in turn Calculus. You are expected to complete each problem without the aid of a calculator. The calculator is a *tool* to verify your solution. You must show all work on a *separate* sheet of paper. The purpose of your work is to justify your solution. Use EXACT answers and reduce all fractions to lowest terms. You may work together on this packet and remember to show work and/or explanations, as needed. There are helpful websites at the end of the exercises to assist you.

Solve the equation.

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

2. $\frac{1}{3}(x - 6) = -\frac{2}{5}x + \frac{14}{15}$

Solve the equation for y.

3. $3y - 5x = -13$

4. $3xy + y = 15$

Solve the inequality. Then **graph** your solution on a number line.

5. $3x + 7 > 28$

6. $6x + 4 < 22$ or $5x - 8 \geq 32$

7. $-6 \leq 2 - 3x \leq 11$

8. $|4a + 7| < 13$

9. $|4 - 8x| \geq 100$

Determine whether the lines are *parallel*, *perpendicular*, or *neither*.

10. Line 1: $(1,5)$ and $(-4,-5)$
Line 2: $(-1,-9)$ and $(2,-3)$

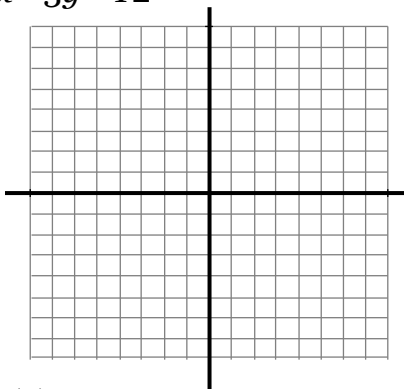
11. Line 1: $(-6,7)$ and $(-3,6)$
Line 2: $(-1,-9)$ and $(1,-3)$

12. Write the **equation** of the line with the slope of $\frac{4}{5}$ and the y-intercept of -5.

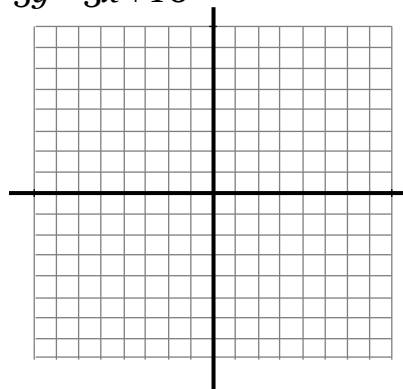
13. Write the **equation** of the line that passes through the points $(-5,3)$ and $(5,-3)$.

Graph the equation using the most appropriate method. Be sure to include key points. Use the separate graph grids on the last page of this packet for your final answer.

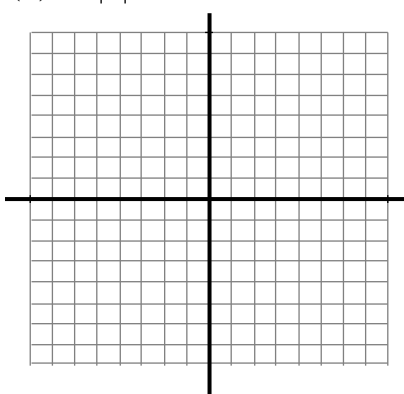
14. $5x - 3y = 12$



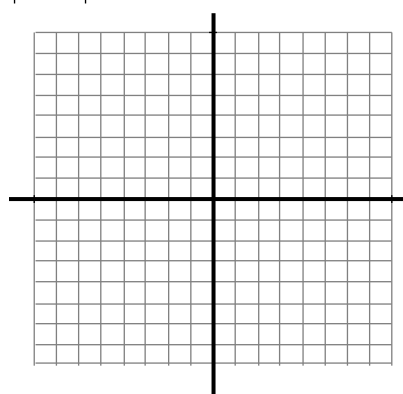
15. $5y = 3x + 10$



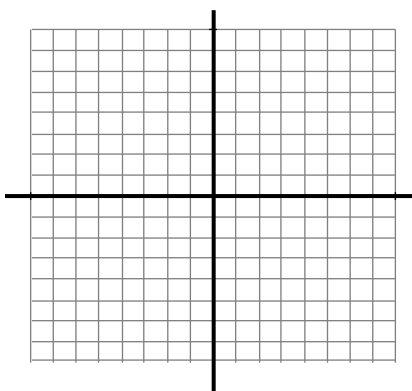
16. $f(x) = -|x| + 2$



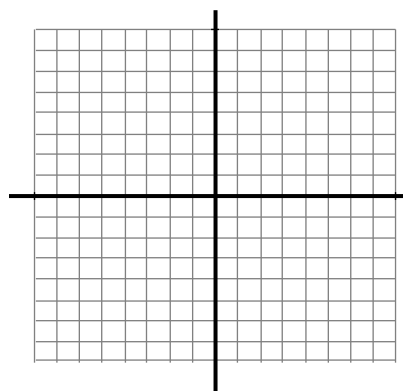
17. $f(x) = |x - 2| - 3$



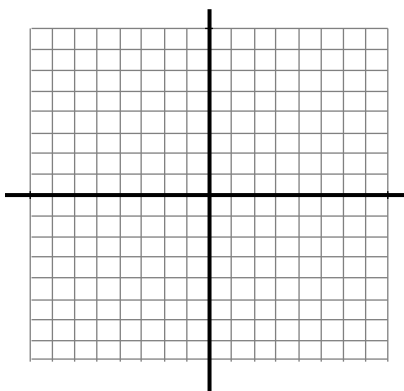
18. $f(x) = |1 - x| + 3$



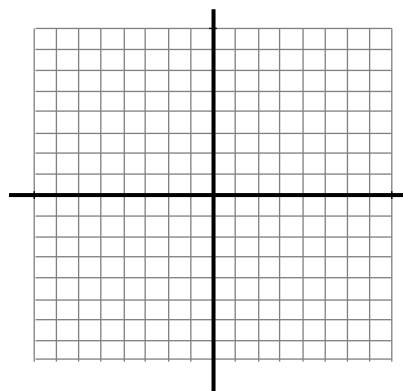
19. $f(x) = \frac{1}{2}(x + 3)^2$



20. $f(x) = -x^2 + 2$



21. $f(x) = -2(x - 1)^2 + 4$



Solve each system of equations, and determine the number of solutions for each.

$$22. \begin{cases} 2x + y = -11 \\ -6x - 3y = 33 \end{cases}$$

$$23. \begin{cases} -4x + 3y = 19 \\ 5x - 7y = -27 \end{cases}$$

$$24. \begin{cases} 21x - 7y = 7 \\ -3x + y = -2 \end{cases}$$

$$25. \begin{cases} \frac{1}{3}x + y = 9 \\ -2x + 2y = -6 \end{cases}$$

#26 – 28 **Evaluate** the function for the given value of x . $f(x) = \begin{cases} 3x^2 + 2, & \text{if } x \leq -1 \\ -x + 4, & \text{if } x > -1 \end{cases}$

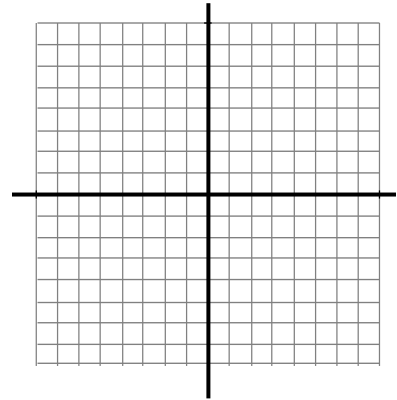
$$26. f(-2) =$$

$$27. f(-1) =$$

$$28. f(0) =$$

$$29. \text{Graph the function. } f(x) = \begin{cases} \frac{1}{2}x - 5, & \text{if } x < -2 \\ 5x + 4, & \text{if } x \geq -2 \end{cases}$$

Draw your final answer on the given graph grid on the last page of this packet.



Factor the trinomial. (Be sure to factor **completely!**)

$$30. 3x^2 + 11x - 4$$

$$31. 9a^2 - 56a + 12$$

$$32. 4x^2 - 2x - 20$$

Use square roots or factoring to **solve** each equation.

$$33. x^2 + 10x = -21$$

$$34. 2x^2 - 13x - 7 = 0$$

$$35. 8y^2 + 5y = 2y^2 + 4$$

$$36. 2(n^2 - 20) + 17n = -10n^2$$

37. $-4(x+2)^2 = -20$

38. $\frac{1}{3}(x+2)^2 = \frac{3}{4}$

39. $\frac{x^2}{9} - 1 = 5$

40. $-\frac{1}{4}(x+1)^2 = -5$

Solve the equation by completing the square. (Must use 'completing the square' method!)

41. $x^2 - 4x + 8 = 0$

42. $x^2 - 10x = 1$

43. $2x^2 - 5x = 7$

Use the quadratic formula to **solve** the equation. (Must use quadratic formula!)

44. $2x^2 + 3x - 8 = 0$

45. $4x^2 - 2x = 3$

Write the **equation** of the quadratic function in standard form $y = a(x-h)^2 + k$.

46. Given the vertex is (2,1) and passes through the point (5,2).

47. Given the vertex is (-1,-4) and passes through the point (-2,-6).

Find the product of the polynomials.

48. $(4x-1)^2$

49. $(x+12)(2x^2-3x+5)$

50. $(2x+3)^3$

Factor the polynomial.

51. $256x^5 - 81x^3$

52. $x^3 + 5x^2 + 8x + 40$

53. $(x^3 + 27)$

54. $2x^3 + 18x^2 - 5x - 45$

55. $3x^5 + 6x^3 - 45x$

Solve the equation. Check for extraneous solutions.

$$56. \sqrt{5x+1} = x-4$$

$$57. x^{2/3} = 16$$

$$58. \sqrt{x+3} = \sqrt{2x-7}$$

$$59. \sqrt[3]{x+4} = 2$$

Perform the indicated operation. Simplify the result completely.

$$60. \frac{20x^5}{y^2} \cdot \frac{x^2y^2}{10x^3}$$

$$61. \frac{x^2-x-20}{x+4} \cdot \frac{x-3}{x^2-2x-15}$$

$$62. \frac{7x^2-14x}{x^3} \div \frac{5x-10}{x^5}$$

$$63. \frac{4}{3x} + \frac{2}{5x}$$

$$64. \frac{2x+1}{x^2-4} + \frac{5}{x-2}$$

$$65. \frac{2x+1}{x^2-4} + \frac{5}{x-2}$$

$$66. \frac{8x-1}{x^2+x-6} - \frac{4}{x-2}$$

$$67. \frac{\frac{4}{x}-4}{2+\frac{1}{x}}$$

Solve each equation.

$$68. \frac{-2}{x+3} = \frac{1}{x+1}$$

$$69. \frac{3}{x^2-9} = \frac{6}{x+3}$$

$$70. \frac{3}{x^2-4} = \frac{2}{x+2} + \frac{x}{x-2}$$

Here are several websites that may help you:

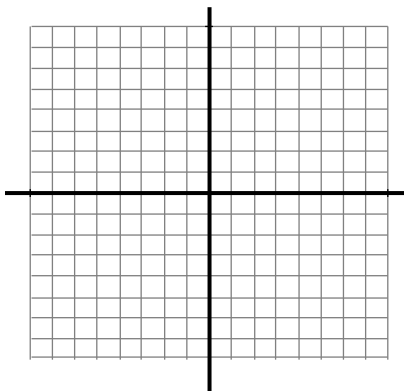
www.algebra.com

www.algebrahelp.com

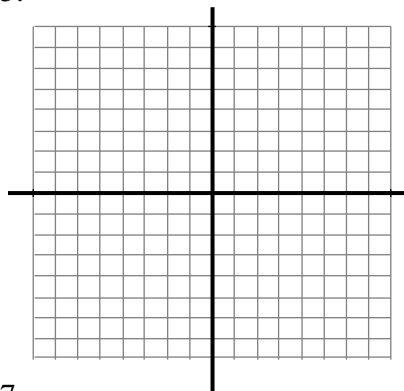
www.mathforum.org

Use this sheet for your graphs. Remove this page from your packet, and staple it to your other work/solutions.

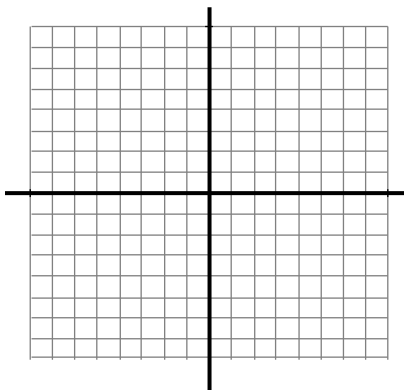
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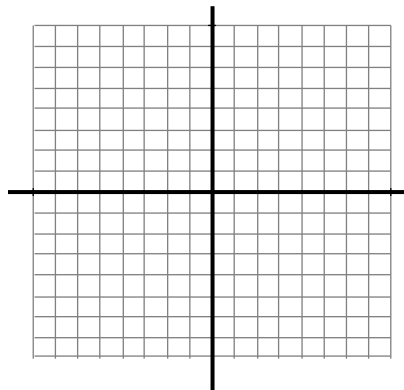
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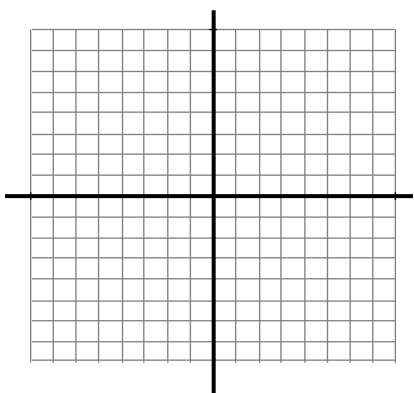
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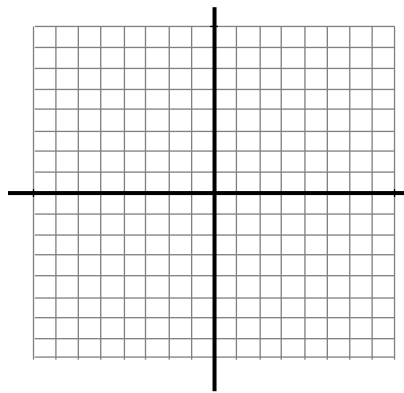
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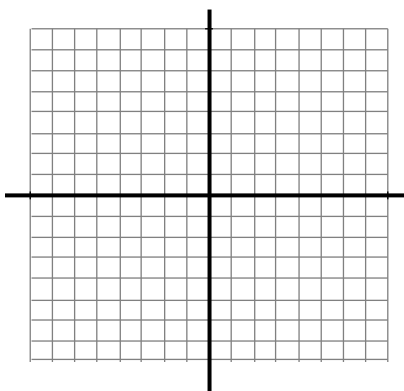
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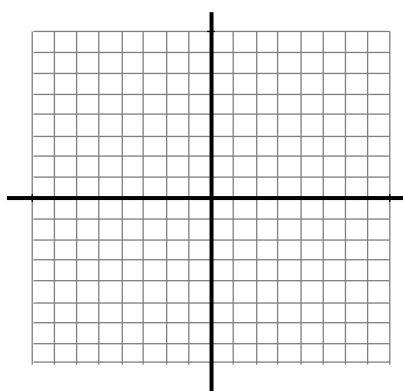
19.



20.



21.



29.

