

Spotswood High School

Mathematics Department

To: Incoming Honors PreCalculus Students
From: Mrs. Mikulak - Honors PreCalculus Teacher
Re: Summer Assignment

To insure a successful year in Honors PreCalculus in September, you are being asked to complete a summer assignment. The goal of the assignment is to provide practice of previously learned skills that will be important in PreCalculus. These problems are based upon previously taught material that should be review in nature.

Please follow these important instructions carefully while completing this summer assignment:

1. Due Date: **The First Day of School**
2. Please do your best to answer each question completely.
Show all of your work neatly and clearly.
3. In the first few days of school we will refer to the Summer Assignment to review concepts that students need to know for their **first assessment**.
4. All work must be shown in the space provided. Plan ahead!
5. Use your notes from Algebra II if you are having difficulty with a problem.
6. Consult the internet for help, if needed.

Graphing calculators will be used extensively throughout this course and are a tremendous aid in understanding the material. It is **strongly recommended** that students purchase their own Texas Instrument 83/84-Plus Graphing Calculator.

Answer the following questions completely. Show all work.

1. Solve the equation by factoring, by finding square roots, or by using the Quadratic Formula: $14c^2 - 19c + 4 = -11c(c - 1) - 5$.

2. Write each expression in simplest radical form:

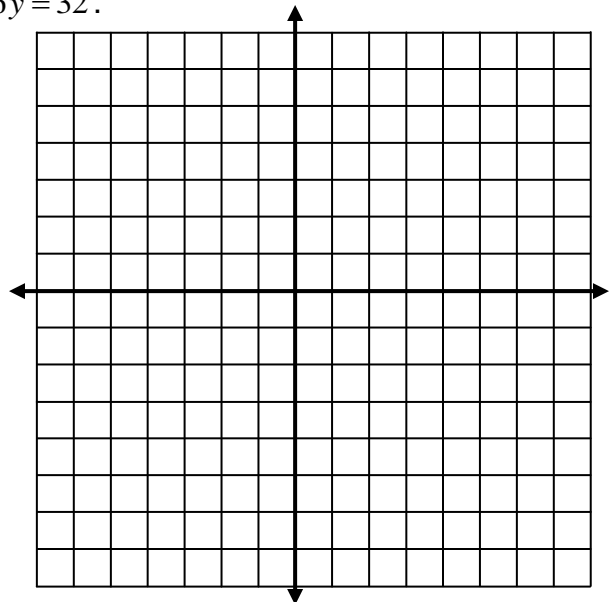
a) $\frac{\sqrt[3]{4}}{\sqrt[3]{32}}$

b) $\sqrt[3]{375} - \sqrt[3]{81}$

In questions 3 –4, refer to the parabola $16x^2 + 16y = 32$.

3. Find the vertex and the axis of symmetry.

4. Sketch the parabola.



5. Find the points of intersection, if any, of the equations.

$$x^2 + y^2 = 5$$

$$x - y = 1$$

6. Perform the indicated operations and simplify.

$$\frac{x+2}{x+9} \cdot \left[\frac{x^2+9x}{x^2-4} \div \frac{3x^2+6x}{x^2+2x} \right]$$

7. Solve the equation.

$$\frac{2x}{x-2} = \frac{1}{x^2-4} + 1$$

8. Perform the operations and simplify.

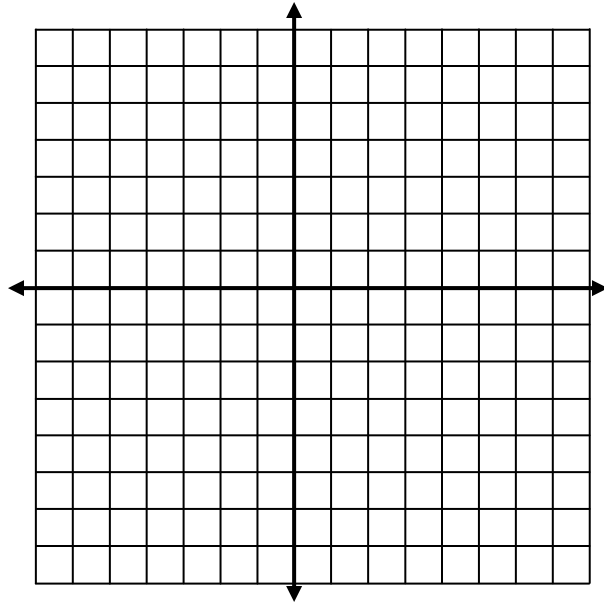
$$\frac{4x}{x^2 - 9} + \frac{2}{x+3} - \frac{2}{x-3}$$

9. Use long division or synthetic division to find the quotient: $(x^3 - 3x^2 + 2x - 8) \div (x + 2)$

10. Multiply and simplify. $\frac{12x^{-3}}{y^4} \cdot \frac{(y^{-2}x^2)^{-1}}{15x^{-2}}$

11. Describe the transformation required to obtain $f(x) = (x + 2)^2 - 3$ from the graph of $g(x) = x^2$?

12. Find the inverse of the given function. Sketch the original function and its inverse of the same set of axes. $f(x) = \frac{2}{3}x - 2$



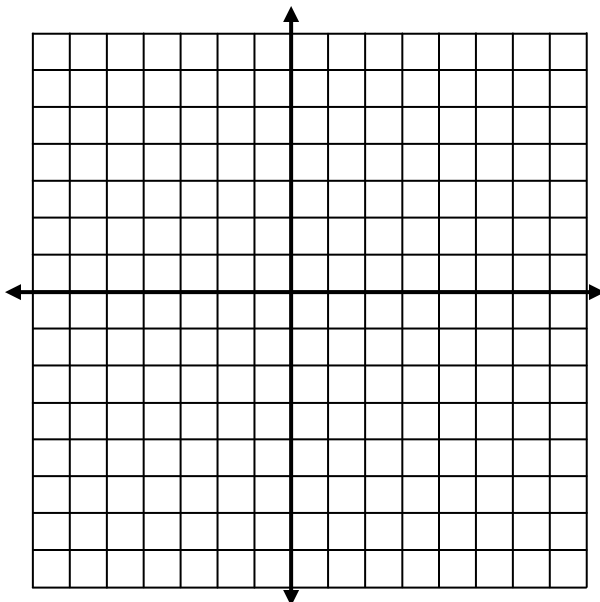
13. Given $f(x) = 2x - 3$ and $g(x) = x^2 + 3$, find $f(g(x))$ and $g(f(x))$.

14. State the left and right hand behaviors (end behaviors) of the graph $g(x) = 2x^5 - x^2 + 2x - 1$.

15. Condense the expression. $\frac{1}{5}\log_3 32 - 2\log_3 x + \frac{1}{2}\log_3 y$

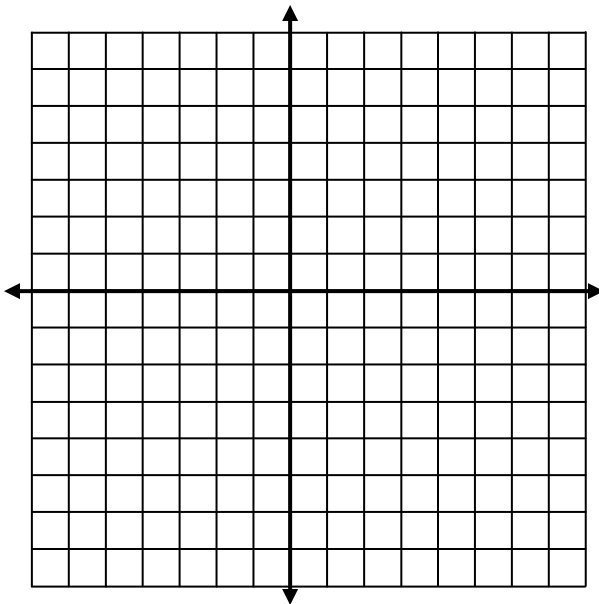
16. Solve the logarithmic equation $5\log_x 2 - \log_x 16 = 2 - \log_x 2$.

17. Sketch the graph. State the domain and range. $f(x) = \sqrt{x+5}$

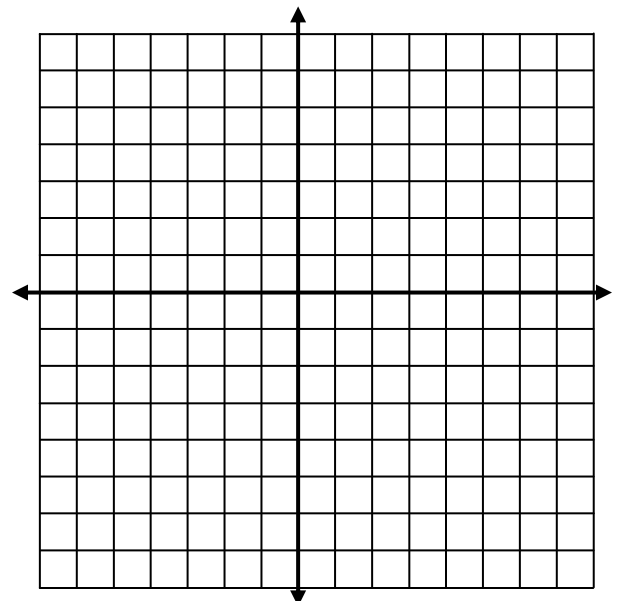


18. Solve for x: $e^{3x} = 9$

19. Sketch and shade the solution of the system of linear inequalities $\begin{cases} y \geq 3x \\ y \geq \frac{2}{3}x + 7 \end{cases}$.



20. Graph $f(x) = \begin{cases} x^2 - 4x + 5, & x < 3 \\ -2x + 6, & x \geq 3 \end{cases}$



21. Solve the inequality algebraically. Write the solution in interval notation.

$$|2 - 2x| - 3 < 5$$

22. Determine the equation of the line that passes through the point (3, -3) and is parallel to $-8x + 5y = 6$. Write your answer in point slope form.

23. A rock falls from a tower that is 272 feet high. As it is falling, its height is given by the formula $h = 272 - 16t^2$. How many seconds will it take for the rock to hit the ground?

24. Simplify the product $(3 - 2i)(3 + 2i)$. Write your answer in standard form.

25. Solve the equation $x^2 + x = -4$ algebraically.

26. Consider the set of numbers: $\left\{-17, -\frac{9}{13}, 0, 0.75, 3i, \sqrt{2}, \pi, \sqrt{81}\right\}$

List all numbers that are in each set. Some numbers may be in more than one set.

a. whole numbers

b. integers

c. rational numbers

d. irrational numbers

e. complex numbers

For questions 27 – 30, evaluate/simplify each exponential expression completely. Write all answers with positive exponents. Do not write your answer as decimals.

27. $2^{-4} + 4^{-1}$

28. $5^{-3} \cdot 5$

29. $(-2x^{-4}y^3)^4$

30. $(-5x^3y^2)(-2x^{-11}y^{-2})$

For questions 31 – 34, factor completely, or state that the polynomial cannot be factored.

31. $3x^4 - 9x^3 - 30x^2$

32. $3x^2 - 12$

33. $x^3 - 3x^2 - 9x + 27$

34. $15x^2 - x - 2$

35. $8x^3 - 125y^3$

36. **Solve for g.** $T = gr + gvt$

37. **Evaluate the function at the given value.**

$$g(x) = \begin{cases} \sqrt{x-4}, & \text{if } x \geq 4 \\ 4-x, & \text{if } x < 4 \end{cases}$$

a) $g(-3)$

b) $g(4)$

For questions, 38 and 39, determine the domain of each function. Write your answer in interval notation.

38. $f(x) = \sqrt{5-2x}$

39. $g(x) = \frac{x+1}{x^2-7x+10}$

For questions 40 – 42, perform the indicated operations.

40. $(13x^4 - 8x^3 + 2x^2 + 1) - (5x^4 - 3x^3 + 2x^2 - 6)$

41. $(3x-2)(4x^2+3x-5)$

42. $(5x-3)^2$