



Honors Pre Calculus Summer Assignment

Dear future students of Pre-Calculus, enclosed in a summer math assignment that will help prepare you for Pre-Calculus. Pre-Calculus consists of those subjects, skills, and insights needed to understand calculus. It includes arithmetic, algebra, coordinate geometry, trigonometry, and, most of all, functions---the general concept as well as specific functions. Students come to this course familiar with basic arithmetic, algebra I & II, and geometry. In order for students to keep proficient at these skills, the Pre-Calculus teachers have put together this assignment. It contains some of the algebra concepts necessary in order to be successful next year. Additional practice problems can be found online, and in any Algebra II textbook. A couple of websites that are worth noting are: www.purplemath.com and www.algebrahelp.com and mathforum.org/dr.math.

Mrs. Clark has started a wiki space for you to help on the assignment, if needed. You will be required to create a username and password. Your username be in the following form: Lastname_Firstname. You will need to be accepted before you post a question about the assignment, and you may also answer a question if you think you can help. Mrs. Clark will monitor the site all summer, except when she is on vacation. Please do not get upset if you do get an immediate reply. The name of the wiki is Sine-for-it, and is located at wikispaces.com.

Copy problems onto separate piece of paper. Show work to justify and explain your answers. Write neatly. This assignment is due the first day of class and is graded on effort, neatness, and accuracy.

Identify the domain and range. Tell whether the relation is a function.

1. $(-1, 5), (-3, 2), (2, 0), (1, 2)$

2. $(-4, 3), (-4, -1), (-2, 4), (0, 2)$

Graph the functions. Clearly label x and y axis, any intercepts, and any min or max. Use a ruler to make nice graphs.

3. $y = x - 4$

4. $y = -x$

5. $f(x) = -3$

6. $x = 7$

7. $y = |x - 4| + 3$

8. $y = (x+1)^2 - 4$

9. $y = -x^2 + 3$

10. $f(x) = \begin{cases} \frac{1}{2}x + 4, & \text{if } x < 2 \\ -2x + 9, & \text{if } x \geq 2 \end{cases}$

11. $f(x) = \begin{cases} x + 2, & \text{if } x > 1 \\ -x + 2, & \text{if } x \leq 1 \end{cases}$

Evaluate the function for the given value of x. Remember, copy the problem on separate piece of paper and show all work. Circle or box your final answer.

12. $f(x) = 3x - 11; f(0)$

13. $f(x) = x^2 - 4; f(1)$

14. $f(x) = 6 - x; f(-5)$

Evaluate the function for the given value of x.

$$f(x) = \begin{cases} x + 1, & \text{if } x > 1 \\ -x - 2, & \text{if } x \leq 1 \end{cases} \quad g(x) = \begin{cases} 3x + 2, & \text{if } x < 5 \\ -2x, & \text{if } x \geq 5 \end{cases}$$

15. $g(5)$

16. $g(-2)$

17. $f(3)$

Simplify the radical expression.

18. $\sqrt{15x^2}$

19. $\sqrt{200x^4y}$

20. $\sqrt[3]{81x^4y^7}$

Simplify the exponential expression.

21. $4a^3b^2 \cdot 3a^4b^3$

22. $\frac{x^5}{2x^3}$

23. $\frac{4x^0y^{-2}z^3}{4}$

Determine the slope of a line that goes through the two given points.

24. $(12, 5), (-3, 4)$

25. $(5, -2), (5, -4)$

Write equation of the line that passes through the given two points. Write your answer in slope intercept form. Recall the slope formula and point slope formula.

26. $(2, 5), (4, -1)$

27. $(-2, 1), (4, 7)$

Factor the quadratic trinomial. Recall the GCF and “ac-b method.”

28. $x^2 - 10x + 9$

29. $x^2 + 2x - 24$

30. $2x^2 + 6x - 108$

31. $3x^2 - 8x + 4$

Factor by grouping, difference of squares, GCF, or like a quadratic trinomial.

32. $x^3 - x^2 - 9x + 9$

33. $x^3 - x + 5x^2 - 5$

34. $x^2 - 25$

35. $25x^2 - 9$

36. $x^4 - 16x^2 + 64$

Solve the following equations by factoring. Recall to set equation equal to zero and factor, and then set each factor equal to zero.

37. $3x^2 = 9x$

38. $x^2 = 2x + 15$

39. $(x+1)(x-5) = 0$

40. $3x^2 - 16x - 7 = 5$

Let $f(x) = 2x^{-1}$ and $g(x) = x - 2$. Perform the indicated operation and state the domain.

41. $f(g(x))$

42. $g(f(x))$

43. $f(f(x))$

If possible, simplify the rational expression. Recall to factor the numerator and denominator, and then divide out common factors.

44. $\frac{y^2 - 81}{2y - 18}$

45. $\frac{2x - 3}{4x - 6}$

46. $\frac{x + 3}{x^2 + 6x + 9}$

Multiply or divided the rational expression and simplify the result.

47. $\frac{x^2 + 2x - 3}{x + 2} \cdot \frac{x^2 + 2x}{x^2 - 1}$

48. $\frac{5x - 20}{5x + 15} \cdot \frac{2x + 6}{x - 4}$

49. $\frac{x^2}{x^2 - 1} \div \frac{3x}{x + 1}$