Augusta Christian Schools

AP PreCalculus

Summer Work

Mrs. Stephanie Kellogg

Please follow all the instructions. Failure to follow all directions will result in a zero on this assignment.

1. This is a college level course, and the expectation is that you rise to the challenge and demonstrate a college level work ethic and quality work .
2. You must show all of your work for each problem.
3. You must write all the work neatly in the space provided for each problem.
4. You may not use google or any other math-based software to solve the problems.
5. You may use google only to review concepts.
6. Do not wait until the last minute to complete this packet.
7. This is an individual assignment. Please complete on your own and to the best of your ability.
8. At the end of the assignment, please rate the difficulty level and sign the printed statement.
9. Be sure your name is on the assignment.
10. If you have any questions, email me (stephaniekellogg@augustachristian.org)!
11. Turn the assignments in to Mrs. Kellogg **on the first day of school, August 5.**

Student's Name: _____

AP PreCalculus Summer Work

Evaluating Algebraic Expressions. Evaluate the following expressions for each value of x. (If not possible, state the reason.)

1. Evaluate: $x^2 - 6x + 5$
   a. For $x = 2$
   b. For $x = -2$

2. Evaluate: $\frac{x}{x-3}$
   a. For $x = -3$
   b. For $x = 3$

Performing Operations. Perform the operation. (Write fractional answers in simplest form.)

3. $|-3| + 4(-2) - 6$

4. $\frac{|-10|}{-10}$

5. $\frac{5}{18} \div \frac{10}{3}$

6. $\frac{x}{5} + \frac{7x}{12}$

Using Properties of Exponents. Simplify each expression.

YouTube video link: Algebra Basics: Laws Of Exponents - Math Antics

7. $3x^2\left(4x^3\right)^3$

9. $\left[(y+2)^2\right]^3$

8. $\frac{36a^5}{9a^{10}}$

10. $\frac{40\,(b-3)^5}{75\,(b-3)^2}$

Rewriting with Positive Exponents. Rewrite each expression with positive exponents and simplify completely.

11. $\left(a^2b^4\right)\left(3ab^{-2}\right)$

13. $\left(x+y^{-1}\right)^{-1}$

12. $\frac{3^{-4}m^{-1}n^{-3}}{9^{-2}mn^{-3}}$

14. $\left(\frac{x^{-3}}{y}\right)\left(\frac{x}{y}\right)^{-1}$

Simplifying Radical Expressions. Simplify each radical expression. You may not use a calculator. Leave your answer in simplest radical form.

YouTube link: Math Antic - Simplifying Square Roots

15. $\sqrt[3]{\frac{64}{125}}$

16. $\sqrt{49^3}$

17. $\sqrt[3]{\frac{2x^3}{27}}$

18. $\sqrt[5]{64x^6}$

19. $\sqrt{8x^3} + \sqrt{2x}$

20. Explain why $\sqrt{x^2 + 4} \neq x + 2$. Provide a counterexample that proves the statement false.

Rationalizing. Rationalize the denominator or the numerator of the expression.

21. $\frac{1}{2+\sqrt{3}}$

22. $\frac{\sqrt{2}-\sqrt{11}}{3}$

Multiplying Polynomials. Find the product.

23. $(3x - 6)(5x + 1)$

24. $(2x - 3)^2$

25. $\left(3\sqrt{5} + 2x\right)\left(3\sqrt{5} - 2x\right)$

26. $(x - 4)^3$

Factoring Completely. Completely factor the expression.

27. $x^3 - x$

28. $x^2 - 12x + 36$

29. $x^3 - 64$

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

Rational Expressions. Perform the indicated operation and simplify.

31. $\frac{x^2-4}{x^4-2x^2-8} \bullet \frac{x^2+2}{x^2}$

32. $\frac{1}{x-1} - \frac{1-x}{x^2+x+1}$

Linear Functions.

33. A line passes through $(7,\ 4)$ and $(3,\ -\ 4)$. Find the equation for the line in all three forms for linear equations.

Slope-intercept form:	Point-slope form:	Standard form:
$y = mx + b$	$y - y_1 = m(x - x_1)$	$Ax + By = C$

Linear Functions. Solve each equation or inequality.

34. $4x - 9 < 7x + 15$

36. $6(3x - 2) = -4(2x - 9)$

35. $\frac{2}{3}x + 4 = \frac{4}{5}x - 3$

Piecewise Functions. Evaluate the following piecewise function for the given values of the variable.

37. Find each of the following values given that $f(x) = \begin{cases} x^3 - 4 & when \quad x < -6 \\ 2x + 7 & when \quad -6 \le x < 1 \\ \frac{x}{x^2+2} & when \quad x \ge 1 \end{cases}$

a. $f(-6)$ b. $f(1)$ c. $f(6)$ d. $f(0)$

Quadratic Equations. Solve each problem by factoring or using the quadratic formula. Round answers to the nearest hundredth as needed.

38. $x^2 + 4x + 3 = 0$

39. $3x^2 - 5x - 9 = x^2 + 3$

40. $x^2 - 5x = 6$

41. $2x^2 + 8x = -7$

Applications of Quadratic Functions. Answer each question. A graphing calculator will be helpful.

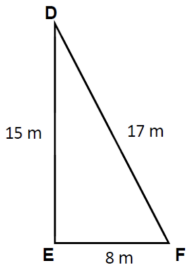
42. A ball is launched straight up with a velocity of 40 feet per second. The ball's height above the ground can be modeled by $H(t) = -16t^2 + 40t + 5$.
    a. How high is the ball when it is released? Explain your answer.

    b. How long does it take the ball to reach its maximum height? Explain your answer.

    c. What is the maximum height the ball reaches? Explain your answer.

    d. How long is the ball in the air? Explain your answer.

Right Triangle Trigonometry. Use the following figure to answer questions 43-49.



43. $sin\ F$

44. $cos\ F$

45. $tan\ F$

46. $sin\ D$

47. $cos\ D$

48. $tan\ D$

49. Calculate the measure in degrees of $\angle$F.

50. When a ladder leans against a wall, it reaches a height of 15 feet. The angle of incline is 60°. How far away from the wall is the base of the ladder?

On a scale from 1 to 10 (1 being extremely easy and 10 being extremely difficult), how difficult was this summer assignment? _____

Statement: "I did this work on my own and did not copy answers from any source."

Signed: _____