Purpose:
The summer assignment provides our students opportunity to build their foundation of the prerequisite knowledge necessary for them to realize success in their AP/PAP math course.

Expectations:
- ALL STUDENTS who are enrolled in an AP/PAP math course are to complete the summer assignment for the course they have chosen to begin in the fall.
- ALL ANSWERS MUST BE JUSTIFIED algebraically, graphically or verbally.
- All justifications must be neat, complete, organized and written in the space provided.
- All final answers must be circled.
- A calculator should only be used on problems where calculator use is indicated.
  Only 17 of 45 multiple-choice and 2 of 6 free-response AP Calculus questions are calculator active.
  Of the calculator active questions, approximately half require the use of a calculator.
- It is best to complete the assignment in the latter of the summer. However, do not wait until the last minute to complete the assignment.
- The assignment will be checked for completeness.
- Students may use resources to assist them with the assignment.
  Suggested online resources:
  www.freemathhelp.com                        www.calculus-help.com
- For questions concerning these expectations, please contact: Spencer.Conley@humble.k12.tx.us

Deadline:
The complete assignment is due the first day of class.

Final Thought:
Excellence is not achieved by chance. It is realized through intelligent, diligent preparation.

Let us have a great summer and an even better new year.
ATTITUDE IS EVERYTHING!
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 following functions on the graph at the end of this paper. Clearly label x and y axis, any intercepts, and any minimum or maximum.

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 \( x \).

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 \( x \).

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

\[
g(x) = \begin{cases} 
  3x + 2, & \text{if } x < 5 \\
  -2x, & \text{if } x \geq 5 
\end{cases}
\]

15. \( g(5) \) 
16. \( g(-2) \) 
17. \( f(3) \)

Simplify.

18. \( \sqrt{15x^2} \) 
19. \( \sqrt{200x^4y} \) 
20. \( \frac{3\sqrt{56}}{\sqrt{21}} \)

21. \( \sqrt{144} \) 
22. \( \sqrt{27} + \sqrt{75} - \sqrt{12} \) 
23. \( \frac{3\sqrt{81a^8b^5}}{3\sqrt{3a^2b}} \)

24. \( \left( \frac{2x^3y}{x^2(y^2z^4)} \right)^{-1} \) 
25. \( \frac{\sqrt{2}}{1-\sqrt{5}} \) 
26. \( \frac{2-4i}{1-i} \)
Simplify the following exponential expressions.

27. \( 4a^3b^2 \cdot 3a^4b^3 \)  
28. \( \frac{x^5}{2x^3} \)  
29. \( \frac{4x^0y^{-2}z^3}{4} \)

Evaluate the following logarithms.

30. \( \log_8 0.25 \)  
31. \( \log_{16} 16 \)  
32. \( \log_5 1 \)

Solve for \( x \).

33. \( \log x + \frac{1}{2} \log 16 = \log 64 \)  
34. \( 3^{x+2} = 27^2 \)  
35. \( \left( \frac{1}{7} \right)^x = 7^{2x-9} \)

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

36. (12, 5), (-3, 4)  
37. (5, -2), (5, -4)

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

38. (2, 5), (4, -1)  
39. (-2, 1), (4, 7)
Use slope intercept form to write the following equations.

40. A line perpendicular to \( y = \frac{2}{5}x + 4 \) and passing through \((6, -2)\).

Identify the parent function, sketch the graph and identify any transformations.

41. \( f(x) = x^2 + 1 \)  
42. \( g(x) = \sqrt{x - 3} + 2 \)  
43. \( h(x) = -|x + 2| + 1 \)

Factor completely the following.

44. \( x^2 + 2x - 24 \)  
45. \( 2x^2 + 6x - 108 \)  
46. \( 3x^2 - 8x + 4 \)

47. \( x^3 - x^2 - 9x + 9 \)  
48. \( 25x^2 - 9 \)  
49. \( x^4 - 16x^2 + 64 \)
Solve the following equations.

50. $3x^2 = 9x$  
51. $(x + 1)(x - 5) = 0$  
52. $3x^2 - 16x - 7 = 5$

53. $\sqrt{x} + 7 = x + 1$  
54. $\frac{x + 2}{x - 1} = \frac{x}{x + 5}$

Solve the following systems of equations.

55. $\begin{cases} -y = -4 \\ 3x - 6y = -12 \end{cases}$  
56. $\begin{cases} y = x - 2 \\ x + 5y = 20 \end{cases}$  
57. $\begin{cases} x - y + z = -2 \\ 4x - y + 2z = -3 \\ 2x - 3y + 2z = -7 \end{cases}$
Let \( f(x) = 2x^{-1} \) and \( g(x) = x - 2 \). Perform the indicated operation and state the domain.

58. \( f(g(x)) \)  
59. \( g(f(x)) \)  
60. \( f(f(x)) \)

Simplify the following rational expressions.

61. \( \frac{y^2-81}{2y-18} \)  
62. \( \frac{2x-3}{4x-6} \)  
63. \( \frac{x+3}{x^2+6x+9} \)

64. \( \frac{x^2+2x-3}{x+2} \cdot \frac{x^2+2x}{x^2-1} \)  
65. \( \frac{5x-20}{5x+15} \cdot \frac{2x+6}{x-4} \)  
66. \( \frac{x^2}{x^2-1} \div \frac{3x}{x+1} \)

67. Write a function \( H(t) \) that represents the distance between a runner and the finish line, in meters, after \( t \) seconds if he starts 10 kilometers from the finish line and runs at a rate of 5 meters per second.
68. Rupert’s Rent-a-Car will rent you a car for $55 per day with no mileage charge. Mark’s Mobilesfor-Rent will rent you a car for $34 per day plus 15 cents per mile beyond the first 100 miles. For what number of miles is the total cost of a one-day rental the same for both rental companies?

69. Chad is standing on the roof of his apartment building when he throws a ball straight upward over the edge. The ball is 55 feet above the ground when he lets it go. The quadratic equation that models the path of the ball is \( p(t) = -16t^2 + 24t + 55 \). How long does it take for the ball to hit the ground?

70. The chart below show the first, second, and third place finishes, and the total points earned by each of three schools competing in a track meet. How many points is a first place finish in an event worth?

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<th>3rd</th>
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