Lawrence High School’s Honors Calculus
2019 Summer Assignment
Welcome to Honors Calculus:
To be best prepared for Honor Calculus in September, you are assigned a mandatory summer review packet. You will submit this completed packet during the first week of school. This assignment will be graded and count as the first major assignment of the first marking period. If you are struggling with concepts/material, below are some resources for you to reference.

Google Classroom Group Code:
- Go to www.classroom.google.com
- Click on I’m a Student
- Enter access code to access the class.
- CODE: 4q7la

This Google group has been established in order to provide you, the students, with support as a group. If you are struggling with concepts/material, there is a blog option to post questions to one another. In addition, you have the educational resources listed below for additional assistance. Remember, the math course from the current school year is the prerequisite course for the course you have enrolled into for the fall. Your personal notebook and handouts from this year’s class is a resource that is at your disposal.

Directions:
- Complete ALL problems.
- Show all work for every problem on a separate piece of paper.
- Your work should be neatly organized and clearly labeled.
- Be sure your name is on each piece of work paper.

Scoring/Grading:
- The Honors Calculus packet is worth a total of 20 points.
- Each problem is worth one point.
- Any problem with no work shown will receive 0 points.
- A grade based on the completeness and accuracy of your work will be your earned grade on the Summer Assignment will be entered.

Resources:
For additional examples and support you can reference any of the sites listed below.
- KhanAcademy.com
- Youtube.com or Teachertube.com
- MathIsPower4u.com
- IXL.com
In problems 1-4, sketch the graph of the equation by point plotting. (no graphing calculators)

1. \( y = \frac{3}{2}x + 1 \) 
2. \( y = 4 - x^2 \)

3. \( y = |x + 2| \) 
4. \( y = \sqrt{x + 2} \)

In problems 5 – 8, find any intercepts.

5. \( y = x^2 + x - 2 \) 
6. \( y = x^2 \sqrt{25 - x^2} \)

7. \( y = \frac{3(2 - \sqrt{x})}{x} \) 
8. \( x^2y - x^2 + 4y = 0 \)

9. Find the sales necessary to break even \((R = C)\) if the cost \(C\) of producing \(x\) units is \(C = 5.5\sqrt{x} + 10,000\) (Cost equation) and the revenue \(R\) for selling \(x\) units is \(R = 3.29x\) (Revenue equation)

10. Write an equation of the line through the point (a) parallel to the given line and (b) perpendicular to the given line.

Pt. (2, 1) 
Line: \(4x - 2y = 3\)
For 11-12, evaluate (if possible) the function at the given value(s) of the independent variable. Simply the results.

11. \( g(x) = 3 - x^2 \)  
   (a) \( g(0) \)  
   (b) \( g(\sqrt{3}) \)  
   (c) \( g(-2) \)  
   (d) \( g(t-1) \)  

12. \( f(x) = x^2 \)  

For 13 – 14, find the domain and range of the function.

13. \( h(x) = -\sqrt{x} + 3 \)  

14. \( f(x) = \frac{1}{x} \)  

15. Evaluate the function as indicated. Determine its domain and range.

\[ f(x) = \begin{cases} 
2x + 1, & x < 0 \\
2x + 2, & x \geq 0 
\end{cases} \]

(a) \( f(-1) \)  
(b) \( f(0) \)  
(c) \( f(2) \)  
(d) \( f(t^2 + 1) \)  

For 16 – 17, sketch a graph of the function and finds its domain and range. Use a graphing utility to verify your graph.

16. \( h(x) = \sqrt{x-1} \)  

17. \( g(t) = 2 \sin(\pi t) \)
For 18 – 21, determine whether the statement is true or false. If it is false, explain why or give an example that shows it is false.

18. If \( f(a) = f(b) \), then \( a = b \).

19. A vertical line can intersect the graph of a function at most once.

20. If \( f(x) = f(-x) \) for all \( x \) in the domain of \( f \), then the graph of \( f \) is symmetric with respect to the \( y \)-axis.

21. If \( f \) is a function, then \( f(ax) = af(x) \).

22. Given \( f(x) = 2x - 3 \) and \( g(x) = \cos x \), find each composite function.
   a) \( f \circ g \)  
   b) \( g \circ f \)

23. Determine whether each function is even, odd, or neither. Then find the zeros of the function.
   a) \( f(x) = x^3 - x \)  
   b) \( 1 + \cos x \)
24. Identify the relationships for all six trigonometric functions as they relate to $x$, $y$, and $r$.

25. Complete the unit circle below by supplying: the ordered pairs for each point; the radian measures of the angles; and the degree measures of the angles.

**Fill in The Unit Circle**

![Unit Circle Diagram](image-url)
26. Identify the three trigonometric reciprocal identities.

27. Identify the two trigonometric quotient identities.

28. Identify the three trigonometric Pythagorean identities.

29. Graph \( y = \sin x \), for \((-2\pi \leq x \leq 2\pi)\)
30. Graph $y = \cos x$, for $(-2\pi \leq x \leq 2\pi)$

Establish the identities below (i.e. make the left side look like the right side without using right side!)

31. $\csc \theta \cdot \tan \theta = \sec \theta$

32. $\frac{1 + \tan x}{1 + \cot x} = \tan x$

33. $\frac{\tan x + \cot x}{\sec x \csc x} = 1$

Solve the following equations for $0 \leq \theta \leq 2\pi$.

34. $2 \sin \theta + \sqrt{3} = 0$

35. $2 \sin^2 \theta - 3 \sin \theta + 1 = 0$
36. Evaluate the following limits.
   a. \( f(-2) = \) _______
   b. \( f(2) = \) _______
   c. \( \lim_{x \to 0} f(x) = \) _______
   d. \( \lim_{x \to 2} f(x) = \) _______

![Graph of a function]

Evaluate the following limits algebraically. You must show your work for full credit.

37.
\[
\lim_{\Delta x \to 0} \frac{(x + \Delta x)^2 - 3(x + \Delta x) - 2 - (x^2 - 3x - 2)}{\Delta x}
\]

38.
\[
\lim_{x \to 3} \frac{x^2 - 8x + 15}{x - 3}
\]

39.
\[
\lim_{x \to 11} \frac{\sqrt{x + 5} - 4}{x - 11}
\]
40. \( \lim_{{x \to 2}} \frac{(x - 3)^3 (x + 2)}{x - 2} \)