Work each of these problems on this document and turn it in at 11 am on 2/9/16

You should work this assignment in pencil so that you can erase and correct any errors (as opposed to scribbling out work). When writing your solutions, keep in mind the notational and formatting issues discussed and illustrated in lecture and lab; your solution will be evaluated for your success at using correct notation, your success at showing all relevant supporting work, and your success at using appropriate organizational strategies as well as for your success at coming up with a "correct answer."

4.4.1 #4 Suppose that water is being **drained** from each of the containers at a constant rate. Let h_a, h_b, and h_c be the heights (measured in cm) of the liquid remaining in the containers t seconds after the water began to drain. What would you expect the sign to be on the second derivative functions h_a'', h_b'', h_c'' while the containers are being drained? Simply insert <. > or =.

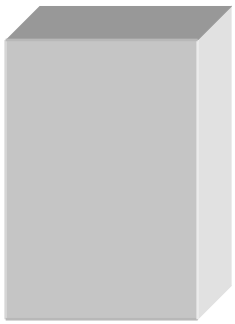

Figure 4.4.6

h_a'' 0

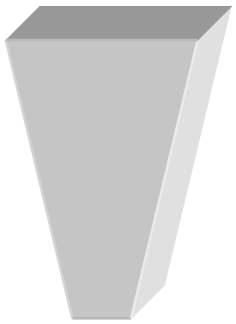

Figure 4.4.7

h_b'' 0

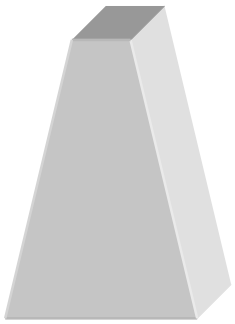

Figure 4.4.8

h_c'' 0

4.5.1 Exercises

Consider the function g shown in Figure 4.5.9.

8. Let G be an antiderivative of g. Suppose that G is continuous on $[-6,6]$, $G(-6) = -3$, and that the greatest value G ever achieves is 6. Draw G onto Figure 4.5.10.

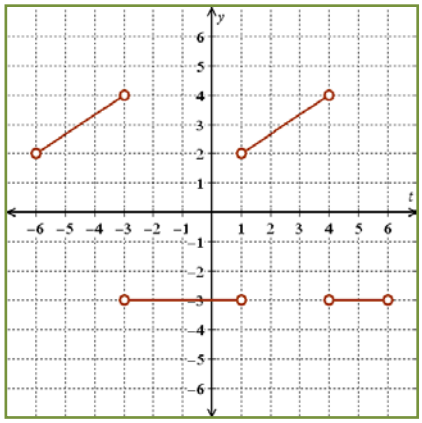

Figure 4.5.9 $y = g(t)$

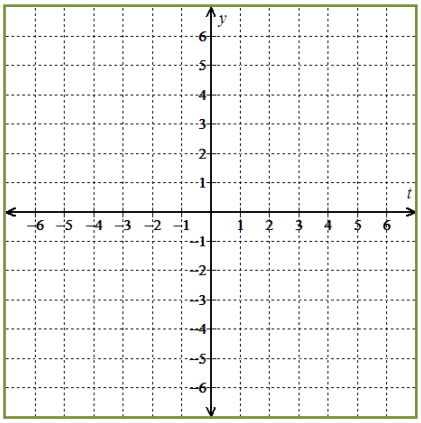

Figure 4.5.10 $y = G(t)$

4.5.1 Exercises

The function f is shown in Figure 4.5.5. Reference this function in the following questions.

3. At what values of x is f nondifferentiable? **You may simply list the values without explanation.**

4. At what values of x are antiderivatives of f nondifferentiable? **You may simply list the values without explanation.**

5. Draw onto Figure 4.5.6 the ***continuous*** antiderivative of f that passes through the point $(-3,1)$. Please note that every antiderivative of f increases exactly one unit over the interval $(-3,-2)$. **Make sure to use a straight-edge to draw any line segments.**

6. Because f is not continuous, there are other antiderivatives of f that pass through the point $(-3,1)$. Specifically, antiderivatives of f may or may not be continuous at -1. Draw onto figures 4.5.7 and 4.5.8 different antiderivatives of f that pass through the point $(-3,1)$.

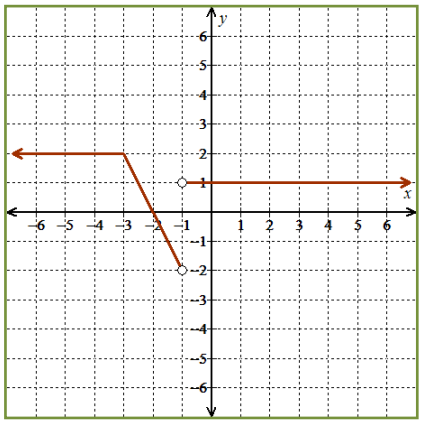

Figure 4.5.5: f

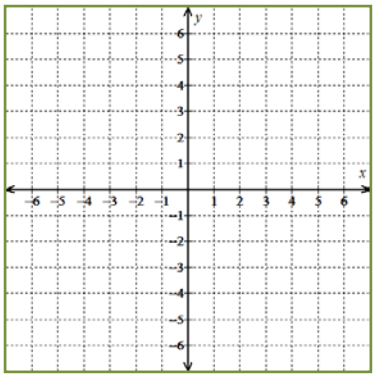

Figure 4.5.6

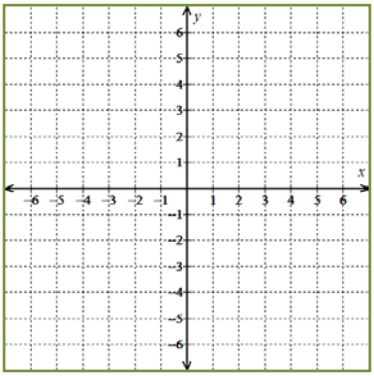

Figure 4.5.7

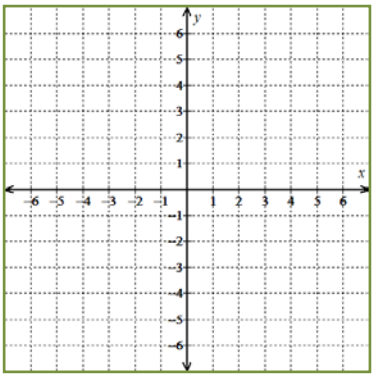

Figure 4.5.8