

Study Technique 5 On getting a test returned, go over the questions that you did incorrectly and make sure you understand how to do those questions. Keep the test, and, a day or so before your next test, rework the test while simulating a test atmosphere (no lecture notes, no phone calls, no TV, no radio, etc). If you run out of time, draw a line across at the “time up” mark, and continue to work the test, and write down how much extra time was needed to finish the test. This will give you an idea of how fast you will need to work in order to finish the real test. Ideally, you will have time to enact such a simulation a few times with different practice tests, and so get adjusted to the test atmosphere.

Due at the start of class on Mon Sept 29, 2008.

Answer the following questions in groups of two, but turn in one solution sheet per student. Write neatly and orderly as points will be deducted for messy work. No work shown \Rightarrow partial/full credit not possible, so show as much work as possible.

1. The following are difference quotients $\frac{f(a+h) - f(a)}{h}$; identify $f(x)$ and a in each case.

(a) $\frac{(1+h)^2 - 1}{h}$

(b) $\frac{\sqrt{4+h} - 2}{h}$

(c) $\frac{\sin h}{h}$

(d) $\frac{\cos h - 1}{h}$

(e) $\frac{\frac{1}{1+h} - 1}{h}$.

2. (a) What is the slope of a horizontal line? What is the slope of a horizontal tangent line?

(b) What is the slope of a vertical line? What is the slope of a vertical tangent line?

Suppose that for some function, g , we know that $\lim_{h \rightarrow 0} \frac{g(x+h) - g(x)}{h} = \frac{4}{3} x^{-2/3} (x+1)$.

(c) Find the x -coordinates of all points on the graph of $y = g(x)$ where the tangent line is horizontal; if no such points exist, explain why not. Hint: recall (a).

(d) Find the x -coordinates of all points on the graph of $y = g(x)$ where the tangent line is vertical; if no such points exist, explain why not. Hint: recall (b).

3. (a) As you know, many lines pass through origin. Give equations for three specific lines that pass through origin. Give an equation for an arbitrary (i.e., nonspecific) line that passes through the origin.
- (b) The derivative of $\frac{1}{x}$ at $x = a$ is $-\frac{1}{a^2}$. Find an equation for the tangent line to the graph of $y = \frac{1}{x}$ at $x = a$.
- (c) Show that no line that is tangent to the graph of $y = \frac{1}{x}$ passes through the origin. Hint: recall (a) & (b).
4. (a) As you know, many lines pass through the point $(5, 0)$. Give equations for three specific lines that pass through $(5, 0)$. Give an equation for an arbitrary (i.e., nonspecific) line that passes through $(5, 0)$.
- (b) The derivative of x^2 at $x = a$ is $2a$. Find all points on the graph of $y = x^2$ with tangent lines passing through the point $(5, 0)$.
5. (Not due) Read all five study techniques given on the worksheets.
Start work on the essay assignment given online (due Mon Nov 24, 2008).