Common Mistakes to Avoid

1   Bad Algebra

The following is a partial list of "fatal" algebra mistakes. Whenever these mistakes appear in your work, you can expect to automatically lose at least 50% of the points assigned to the problem. So take care to avoid these pitfalls!

- Notice that $(a + b)^n \neq a^n + b^n$, $(n \neq 1)$. In particular, this means that $(a + b)^2$ doesn't expand to $a^2 + b^2$ and $\sqrt{a + b} \neq \sqrt{a} + \sqrt{b}$.

- You can not break up a rational expression of the form $\dfrac{a}{b + c}$ into the sum $\dfrac{a}{b} + \dfrac{a}{c}$. So don't do it!

- Do not replace $\sin(ax)$ with $a \sin x$, $a \neq \pm 1$. They are not equal! (The amplitudes are different.) This goes for the other trig functions too.

- The following are very serious violations of the cancellation laws:

$$\frac{a + b}{a + c} \neq \frac{b}{c} \text{ and } \frac{a + c}{ab} \neq \frac{c}{b}$$

- It is true that if $a \cdot b = 0$, then either $a = 0$ or $b = 0$. However, IT IS NOT TRUE that if $a \cdot b = c$ $(c \neq 0) \Rightarrow a = c$ or $b = c$.

- Be careful when factoring a constant out of a power:

$$(cx + cy)^n = c^n(x + y)^n.$$

    You are not allowed to replace $(cx + cy)^n$ with $c(x + y)^n$ whenever $c \neq 1$.

2   Limits

- When using analytic means to compute a limit, be sure to continue to use the limit notation until you substitute a value in for the variable.

- Do not write the limit notation after you substitute.

- Be sure to use appropriate equal signs in your solution.

3   Derivatives

- Do not equate the function to its derivative, i.e., do not write "$f(x) = f'(x)$." In general, they are not the same!

- Memorize your basic differentiation formulas, in particular the quotient rule.

- Write a summary sentence when using the derivative to answer a question such as slope of the tangent, equation of the tangent line, maximum or minimum of a function, etc.

4   Integrals

- Always include a "$+C$" in your final answer to any evaluation of an indefinite integral.

- Be sure to keep the integral notation until you find an antiderivative.

- Be sure the integral notation is no longer present once you have performed the integration.

- Write down any substitution you are using, no matter how "simple" it seems.

- Change the limits of integration when you apply the substitution method to evaluate a definite integral.

- Be sure to use a summary sentence when you use integration to answer a question such as the area of a region or the solution to a differential equation.

5   Miscellaneous

- Study and be able to "recite" any NAMED THEOREM you have encountered.

- Label all graphs clearly. This includes marking intercepts and labeling functions.

- Use equal signs appropriately!!