

Here are some of the things that I look for when grading. Basically, if something is written, then it must be correct, even if it is not needed in the problem or is part of the steps to solve the problem.

For example:

For  $f(x) = \sin(x)$ , find  $f'(\pi)$ .

$$f'(x) = \cos(x) = \cos(\pi) = -1$$

This would be wrong.

$$f'(x) = \cos(x) \neq \cos(\pi) = -1$$

OR

$$f'(\pi) = \cos(x) = \cos(\pi) = -1$$

This is also wrong.

$$f'(\pi) \neq \cos(x) \text{ and } \cos(x) \neq \cos(\pi)$$

This would be fine, though:

$$f'(x) = \cos(x)$$

$$f'(\pi) = \cos(\pi) = -1$$

Putting  $\cos(0) = 1$  and  $\cos\left(\frac{\pi}{2}\right) = 0$  would be fine, even though they are not needed. However, putting  $\cos(0) = -1$  would be wrong.

Another example:

Find the Limit.  $\lim_{x \rightarrow \infty} \left( \frac{2x^2 - 6x + 1}{9x^2 - 5x + 6} \right)$

$$\lim_{x \rightarrow \infty} \left( \frac{2x^2 - 6x + 1}{9x^2 - 5x + 6} \right) = \lim_{x \rightarrow \infty} \left( \frac{x^2 \left( 2 - \frac{6}{x} + \frac{1}{x^2} \right)}{x^2 \left( 9 - \frac{5}{x} + \frac{6}{x^2} \right)} \right) = \lim_{x \rightarrow \infty} \left( \frac{2 - \frac{6}{x} + \frac{1}{x^2}}{9 - \frac{5}{x} + \frac{6}{x^2}} \right) = \lim_{x \rightarrow \infty} \left( \frac{2 - \frac{6}{\infty} + \frac{1}{\infty}}{9 - \frac{5}{\infty} + \frac{6}{\infty}} \right) = \lim_{x \rightarrow \infty} \left( \frac{2}{9} \right) = \frac{2}{9}$$

They forgot the  $x \rightarrow \infty$  for the limit, and should have dropped the “lim” when they inserted the  $\infty$  into the expression. Thos would each lose a point.

Another common mistake is dropping the function from a limit. They do the work, but then

write:  $\lim_{x \rightarrow \infty} = \frac{2}{9}$ .  $\lim_{x \rightarrow \infty}$  by itself is meaningless. You always need the limit OF SOMETHING.

Here is a general run-down of mistakes that would lose a point (for both the Fall and Spring, but I might have left some things out):

Dropping “lim” or the  $x \rightarrow a$  subscript.

Putting “lim” in when it shouldn’t be there.

Dropping the function from the limit.

Wrong use of  $f(x)$  or  $f(a)$ .

Wrong use of  $f'(x)$  or  $f'(a)$ .

Wrong use of  $\frac{dy}{dx}$  or  $\frac{dy}{dt}$  (mixing up the 2).

Minor arithmetic error ( $3^2 = 6$ ).

Setting non-equal expressions equal to each other.

Some derivative errors (minor errors, such as forgetting a negative).

Forgetting  $+c$  for Antiderivatives.

Adding  $+c$  for Definite Integrals.

Intercepts, minimums, maximums, inflection points not listed as points.

Asymptotes not listed as lines.

Wrong units.

Forgetting  $dx$ .

Adding  $dx$ .

Using wrong  $dx$  (when it should be  $dt$  or  $d\theta$ ).

Wrong endpoints for a Definite Integral.

Forgetting endpoints for a Definite Integral.

Things that would lose 2 points:

Most incorrect integrals.

Incorrect derivative (more than a minor error).

Lacking a coherent flow in working through a problem. Another person should be able to follow the process that was taken to solve the problem. Disjointed expressions should not exist. Equal signs should be used to indicate the flow of changes made when solving equations or manipulating expressions. Severe discontinuity may lead to losing more points.

These are general guidelines. I look at the overall situation and take things in context of the problem. If the student is very off-base, then he/she will lose more points. An error early in the problem could have little impact (minor arithmetic error) or a lot (wrong choice of integral technique, such as the wrong  $u$ ).

I know that I have left things out, but this gives you an idea of my general thinking.