Examples from the Reading:

Using Math Mode

This is an example of using display math mode versus inline math. You should also note the punctuation:

> If d is Bob's distance above the ground in feet, then $d = 100 - 16t^2$, where t is the number of seconds after Bob's Flugelputz-Levitator is activated. Solving for t in the equation $100 - 16t^2 = 0$, we find that $t = 2.5$. Bob hits the ground after 2.5 seconds.

Compare that to this version, which uses math mode to make important parts of the discussion (math) stand out:

> If d is Bob's distance above the ground in feet, then
>
> $$d = 100 - 16t^2,$$
>
> where t is the number of seconds after Bob's Flugelputz-Levitator is activated. Solving for t in the equation
>
> $$100 - 16t^2 = 0,$$
>
> we find that $t = 2.5$. Bob hits the ground after 2.5 seconds.

Multiple equations or expressions should generally be aligned

The following equations

$$\begin{aligned} 3^{2x}-2(x^x)&=-1\\ (3^x)^2-23^x)+1&=0\\ (3^x-1)^2&=0 \end{aligned}$$

were typeset using the following code:

```
\begin{align*}
3^{2x}-2(x^x)&=-1\\
(3^x)^2-23^x)+1&=0\\
(3^x-1)^2&=0
\end{align*}
```

Example 1:

Introduction

This example is from an introduction to a theorem. What is some advice you might give the authors:

> In this lab we will examine the application's of Clairaut's Theorem. Both when it does and does not apply.
>
> **Theorem** (Clairaut)**.** *Suppose f is defined on a disk D that contains the point (a, b). If the functions f_{xy} and f_{yx} are both continuous on D, then*
>
> $$f_{xy}(a, b) = f_{yx}(a, b).$$
>
> for the function
>
> $$f(x, y) = 3x * y + 2y$$
>
> $$f_{yx} = f_{xy} = 3$$
>
> in this case the theorem works. We will consider a certain function that will not satisfy these hypotheses, and will give an example of a function and a point for which $f_{xy}(a, b) \neq f_{yx}(a, b)$.
>
> Here is the function for you:
>
> $$f(x, y) = ...$$

Example 2:

This example is from the same assignment as the previous one. What advice would you give these authors?

> ## Introduction
>
> **Theorem** (Clairaut)**.** *Suppose f is defined on a disk D that contains the point (a, b). If the functions f_{xy} and f_{yx} are both continuous on D, then*
>
> $$f_{xy}(a, b) = f_{yx}(a, b).$$
>
> ## 1. Examples that will satisfy the theorem:
>
> One function that satisfies the conditions of Clairaut's Theorem is:
>
> $$f = cos(2x) - x^2e^{5y} + 3y^2$$
>
> It satisfies the theorem because its partial derivatives of f_{xy} and f_{yx} are equivalent.
>
> $$f_{yx} = f_{xy} = -10xe^{5y}$$

2. Example that dissatisfies the theorem:

We will consider a certain function that will not satisfy these hypotheses, and will give an example of a function and a point for which $f_{xy}(a,b) \neq f_{yx}(a,b)$.

We are given the function $f(x,y)$ below,

$$f(x,y) = ...$$

Refer to Figure 1 to visualize the Three Dimensional plot of $f(x,y)$ As we can see, from the function displayed above, the function is continuous at the origin.

Example 2:

This example is from the same assignment as the previous one. What advice would you give these authors?

Introduction

Theorem (Clairaut)**.** *Suppose f is defined on a disk D that contains the point (a,b). If the functions f_{xy} and f_{yx} are both continuous on D, then*

$$f_{xy}(a,b) = f_{yx}(a,b).$$

1. To show a few examples of when this theorem is true we will consider the following examlpes.

   $$f(x,y) = ..$$

   We can see that xy is defined on the disk D that contains the point (a,b)

   $$f_{yx} = ..$$

   $$f_{xy} = ..$$

   Because both f_{yx} and f_{xy} are continuous the equation $f(x,y) = xy$ satisfies the conditions of Clairaut's Theorem at the point (a,b)

2. Now we will take a look at a function for which Clairaut's Theorem is not satisfied. Take for instance the following function:

   $$f(x,y) = ...$$

   We need to look at the function when(x,y) = ... We can now plot the function ... to see what it looks like.

3. This function is not defined at the origin so it is not continuous, but there is a limit as x and y go to 0.

(a) Using the definition of limits in Maple it can not determine the limit because the function is not continuous at the origin, but the function does have a limit.

(b) ...

4. In order to see if Claurets theorem ...

and so on...

Looking at the LaTeX code...

```
\begin{itemize}
\item[1.] To show a few examples of when this theorem is true
we will consider the following examlpes.
$$f(x,y)=..$$
We can see that $xy$ is defined on the disk $D$ that contains
the point $(a,b)$
$$f_{yx}=..$$
$$f_{xy}=..$$
Because both $f_{yx}$ and $f_{xy}$ are continuous the equation
$f(x,y)=xy$ satisfies the conditions of Clairaut's Theorem at the
point $(a,b)$


\item[2.] Now we will take a look at a function for which Clairaut's
Theorem is not satisfied.  Take for instance the following function:
$$
f(x,y) = ...
$$
We need to look at the function when$(x,y)=..$. We can now plot the function
\large{$...$} to see what it looks like.

\item[3.] This function is not defined at the origin so it is not continuous,
but there is a limit as x and y go to 0.
\begin{itemize}
\item[(a)]Using the definition of limits in Maple it can not determine the
limit because the function is not continuous at the origin, but the function does h
\item[(b)]...
\end{itemize}
\item[4.]In order to see if Claurets theorem ...
\end{itemize}
```