Data 100 LaTeX cheatsheet

You should use LaTeX to format math in your answers. If you aren't familiar with LaTeX, not to worry. It's not hard to use in a Jupyter notebook. Just place your math in between dollar signs within Markdown cells:

`$ f(x) = 2x $` becomes

$$f(x) = 2x$$

If you have a longer equation, use double dollar signs to place it on a line by itself:

`$$ \sum_{i=0}^n i^2 $$` becomes

$$\sum_{i=0}^{n} i^2$$

You can align multiple lines using the `&` anchor, `\\` newline, in an `align` block as follows:

```
\begin{align}
f(x) &= (x - 1)^2 \\
&= x^2 - 2x + 1
\end{align}
```

becomes

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

Here is some handy LaTeX:

Output	LaTeX
x^{a+b}	`x^{a + b}`
x_{a+b}	`x_{a + b}`
$\frac{a}{b}$	`\frac{a}{b}`
$\sqrt{a+b}$	`\sqrt{a + b}`
$\{\alpha, \beta, \gamma, \pi, \mu, \sigma^2\}$	`\{ \alpha, \beta, \gamma` `\pi, \mu, \sigma^2 \}`
$\sum_{x=1}^{100}$	`\sum_{x=1}^{100}`
$\frac{\partial}{\partial x}$	`\frac{\partial}{\partial x}`
$\begin{bmatrix} 2x + 4y \\ 4x + 6y^2 \end{bmatrix}$	`\begin{bmatrix}` `2x + 4y \\` `4x + 6y \\` `\end{bmatrix}`

For more about basic LaTeX formatting, you can read this article:
https://www.sharelatex.com/learn/Mathematical_expressions

0.0.1 Preliminary: Sums

Here's a recap of some basic algebra written in sigma notation. The facts are all just applications of the ordinary associative and distributive properties of addition and multiplication, written compactly and without the possibly ambiguous "...". But if you are ever unsure of whether you're working correctly with a sum, you can always try writing $\sum_{i=1}^{n} a_i$ as $a_1 + a_2 + \cdots + a_n$ and see if that helps.
You can use any reasonable notation for the index over which you are summing, just as in Python you can use any reasonable name in `for name in list`. Thus $\sum_{i=1}^{n} a_i = \sum_{k=1}^{n} a_k$.

- $\sum_{i=1}^{n}(a_i + b_i) = \sum_{i=1}^{n} a_i + \sum_{i=1}^{n} b_i$
- $\sum_{i=1}^{n} d = nd$
- $\sum_{i=1}^{n}(ca_i + d) = c\sum_{i=1}^{n} a_i + nd$

These properties may be useful in the Least Squares Predictor question.