

# Number Theory

## Math 360 Fall, 2014

### Homework 1

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**Problem 1.** This is a sample Problem. with parts

Bonus: part 1. This part has the custom name "Bonus: instead of a number.

1. part 2

**Solution.** This is the solution. We set up the solution environment to be double spaced, and the margins are a bit bigger than normal. This allows your professor plenty of room to write comments in between the lines or in the margins.

This is how you write a new paragraph. Just skip a line in your document. Use dollar signs for math mode. everything between them is read as math instead of regular text.  $3x + 4y = 5$  is a line. Use double dollar signs to display the equation on its own line.

$$3x + 4y \text{ is a line.}$$

Alternatively, you can use slash and brackets.

$$3x + 4y = 5.$$

There are many more ways to do this. Use google for more advanced ways of writing equations. There are environments for displaying multiple equations, where everything is aligned at the = sign, numbered or unnumbered automatically, defining references for equations to call later. For example, you may want to automatically number an equation, then refer to it later. Here is an example. The equation below

$$(1) \quad 3x + 4y = 5$$

is given a number automatically. I gave it a label so that I can reference equation (1) later. If I insert an equation above, the numbering changes will all propagate automatically!

Now, let's use a new environment...one that automatically aligns equations at the equal sign.

$$\begin{aligned}
 (2) \qquad & a^2 + b^2 = c^2 \\
 (3) \qquad & a^6 = b^3 \\
 (4) \qquad & a^4 \geq b^5 \\
 (5) \qquad & c^{1/2} > \sqrt[3]{x} \\
 (6) \qquad & a_1 = b_{2n+1}
 \end{aligned}$$

In addition to showing you some useful structure for typing math characters, notice that all the equations were automatically numbered. This is not always desirable. A general rule is that using a “\*” will suppress the numbering. For example

$$\begin{aligned}
 & a^2 + b^2 = c^2 \\
 & a^6 = b^3 \\
 & a^4 \geq b^5 \\
 & c^{1/2} > \sqrt[3]{x} \\
 & a_1 \cdot \log_3(4) = b_{2n+1}
 \end{aligned}$$

Let's chat about parenthesis. Notice the difference below

$$\begin{aligned}
 & \left( \int_2^\infty f(x) dx \right)^2 \\
 & \left( \int_2^\infty f(x) dx \right)^2
 \end{aligned}$$

Lastly, it is a good idea to google things. You should never settle for anything that does not look exactly how you want. Here is a link to a nice quick reference that you can print off and keep handy

<http://web.ift.uib.no/Teori/KURS/WRK/TeX/symALL.html>

A nice project is “detexify”.

<http://detexify.kirelabs.org/classify.html>

Use your mouse to sketch what symbol you want, and it tells you the  $\LaTeX$ . ■

Summation notation works like

$$\sum_{k=1}^n \frac{1}{k}$$