

Spring 2011 L^AT_EX Final

Place your name here

Place SID here

May 2,2011

Non-numbered Section

Theorem 0.1 (Pythagorean Theorem).

$$a^2 + b^2 = c^2 \tag{1}$$

The Pythagorean Theorem (1) is the oldest theorem.

Lemma 0.2 (Zorn's Lemma). *Suppose a partially ordered set has the property that every chain (i.e. totally ordered subset) has an upper bound. Then the set contains at least one maximal element [2].*

1 Numbered Section

Definition 1.1 (Union).

$$A \cup B = \{x : x \in A \text{ or } x \in B\} \tag{2}$$

Definition 1.2 (Intersection).

$$A \cap B = \{x : x \in A \text{ and } x \in B\} \tag{3}$$

Theorem 1.3 (De Morgan's Law).

$$\neg(p \vee q) \iff (\neg p) \wedge (\neg q) \tag{4}$$

$$\neg(p \wedge q) \iff (\neg p) \vee (\neg q) \tag{5}$$

Item	Price
Banana	\$5.5
Potatoes	\$4.4
Apples	\$3.3
TOTAL	\$13.2

Table 1: Inventory

1.1 Alignment

Let $x \in \mathbb{C}$ and $i^2 = -1$. Then

$$\begin{aligned}
e^{ix} &= \sum_{n=0}^{\infty} \frac{(ix)^n}{n!} \\
&= 1 + ix + \frac{(ix)^2}{2} + \frac{(ix)^3}{3!} + \frac{(ix)^4}{4!} + \dots \\
&= 1 + ix - \frac{x^2}{2} - i\frac{x^3}{3!} + \frac{x^4}{4!} + \dots \\
&= \left(1 - \frac{(x)^2}{2} + \frac{x^4}{4!} - \dots\right) + \left(ix - i\frac{x^3}{3!} + \dots\right) \\
&= \left(1 - \frac{(x)^2}{2} + \frac{x^4}{4!} - \dots\right) + i\left(x - \frac{x^3}{3!} + \dots\right) \\
&= \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} x^{2n} + i \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{2n+1} \\
&= \cos x + i \sin x
\end{aligned}$$

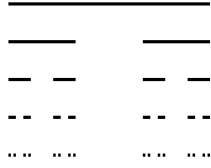
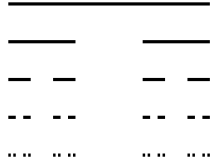
Thus

$$e^{ix} = \cos x + i \sin x$$

1.2 The Wronskian

$$W(f_1, \dots, f_n)(x) = \begin{vmatrix} f_1(x) & f_2(x) & \dots & f_n(x) \\ f_1'(x) & f_2'(x) & \dots & f_n'(x) \\ \vdots & \vdots & \ddots & \vdots \\ f_1^{(n-1)}(x) & f_2^{(n-1)}(x) & \dots & f_n^{(n-1)}(x) \end{vmatrix}, \quad x \in I$$

2 Cantor set



References

- [1] Christian Blanco and Brandon Eltiste. Latex decal, May 2011.
- [2] Wikipedia. Zorn's lemma, May 2011.