Creating a basic document in LaTeX

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Contents

1   Objectives

As I'm learning LaTex, I'll fill this file up with various curious, fun and important things, also commenting the code responsable for this file

2   Mathematics

2.1   Euler's Formula

This is an attempt to creating a simple paragraph and importing a graphical representation as you can see in figure 1, in page 2
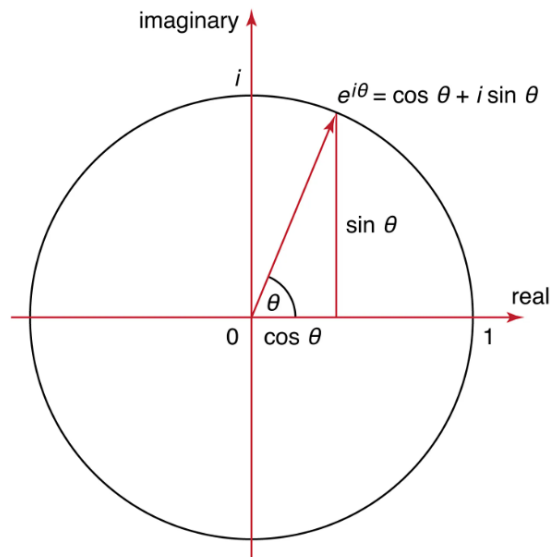

Figure 1: Euler's Formula

2.1.1   The most beautiful formula

In maths, we do have something called the most beautiful formula, and that is Euler's identity minus one:

$$e^{i\pi} - 1 = 0 \tag{1}$$

The actual Euler's Identity is $e^{i\theta} = cos\theta + isin\theta$, and when $\theta = \pi$, we have that:

$$e^{i\pi} = cos\pi + isin\pi \rightarrow e^{i\pi} = 1 + 0 \rightarrow e^{i\pi} = 1 \tag{2}$$

Ergo the *Euler's Identity*

2.2   Limit

Given f a function where $f : \mathbb{R} \to \mathbb{R}$ and $\exists a \in \mathbb{R} \to f(a) = L$, the $\lim_{x \to a} f(x)$ is given as:
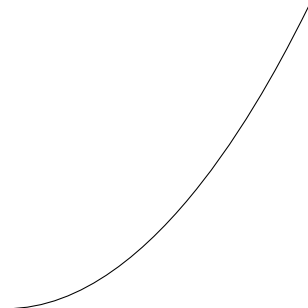
$$\forall \epsilon > 0 \ \exists \delta > 0 : \forall x \in \mathbb{R} \to 0 < |x - a| < \delta \to |f(x) - L| < \epsilon \tag{3}$$

3 Drawing in LaTeX
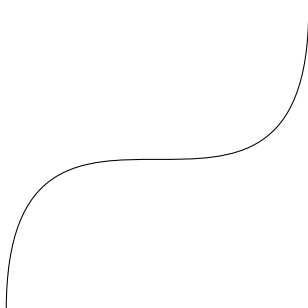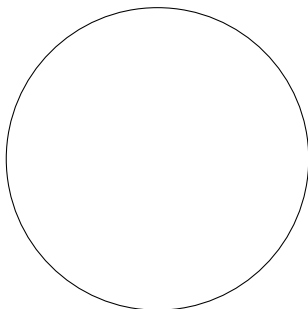
3.1 Lines

3.2 Parabolas

3.3 Controling lines

3.4 Rectangles

3.5 Circles

4 The Fundamentals of Mathematics

4.1 P1 - USP São Carlos

The following subsections will be each question with it's correct answers

4.1.1 Question - 1.a

For any affirmations A and B the following is an tautology

$$(A \to B) \iff (\neg B \to \neg A) \tag{4}$$

Truth Table:

A	B	$\neg A$	$\neg B$	$A \to B$	$\neg B \to \neg A$	$(A \to B) \iff (\neg B \to \neg A)$
T	T	F	F	T	T	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

$$\tag{5}$$

4.1.2 Question - 1.b

For any affirmations A, B and for any absurd C the following are tautologies

$$(\neg A \to C) \to A \text{ and } [(A \wedge \neg B) \to C] \to (A \to B) \tag{6}$$

First truth table:

A	C	$\neg A$	$\neg A \to C$	$(\neg A \to C) \to A$
T	F	F	T	T
T	F	F	T	T
F	F	T	F	T
F	F	T	F	T

$$\tag{7}$$

Second truth table:

A	B	$\neg B$	C	$A \wedge \neg B$	$(A \wedge \neg B) \to C$	$A \to B$	$[(A \wedge \neg B) \to C] \to (A \to B)$
T	T	F	F	F	T	T	T
T	F	T	F	T	F	F	T
F	T	F	F	F	T	T	T
F	F	T	F	F	T	T	T

$$\tag{8}$$