

ASSIGNMENT

SEC-3 : \LaTeX Typesetting for Beginners

ANJALI KMV

November 2024

Contents

1 Introduction

2 About me

3 The Mathematics I studied

3.1 Exposure to high school algebra

3.2 Greek: the new alphabet

3.3 Triangles and the trigonometry

3.4 Calculus and calculations

3.5 Matrices: the ultimate savior

4 \LaTeX typesetting

4.1 My wedding invitation

1 Introduction

This is the assignment we're asked to submit as part of the course 'SEC-3 LATEX Typesetting for Beginners'¹. I did a lot of hard work to complete this. Few of the books and references that helped are the following.

- Well-written books
 - 'L^AT_EX Beginner's Guide' written by Stefan Kottwitz[2].
 - *LaTeX* for Beginner's written by K.B.M. Nambudiripad [3].
- Online resources
 - An interactive guide available on the website https://www.overleaf.com/learn/latex/learn_LaTeX_in_30_minutes.
- The tutorial available on <https://latex-tutorial.com/tutorials/>.
I discussed these things with my friends and fellow students also. They were also very helpful.

1. those who helped throughout the duration of the course
 - (a) khushi
 - (b) kirti
2. Those who helped in preparing this assignment and the presentation.
 - (a) khushi
 - (b) kirti

It was a great learning experience. Thanks to Department of Mathematics, Keshav Mahavidyalaya for giving this opportunity.

ANJALI¹

¹Offered by the mathematics Department, Keshav Mahavidyalaya



Figure 1: That's me

2 About me

My name is **ANJALI**. I was born in **2003**, at my family as a second child. I completed my school education from **S.K.VPRASHANTVIHAR**. I'm currently enrolled in **PHYSICALSCIENCEWITHCOMPUTERSCIENCE** at Keshav Mahavidyalaya which is a constituent college of university of Delhi. I'm in the 3rd semester and I'm currently studying the following courses.

SI. NO.	Course Type	Course Name	Teacher's Name
1	DSC	Computer system architecture	Anand
2	DSC	Differential Equation	DhanpalSingh
3	DSC	Heat and Thermodynamics	kiran
4	DSE	Python Programming for data Handling	NamitaRani
5	SEC	Latex Typesetting for Beginners	RichieAggarwal
6	VAC	VedicMathmatics – 3	Deepak
7	AEC	Hindi - B	KeshavDahiya

3 The Mathematics I studied at my school

Since my childhood, I was very much interested in Mathematics.

3.1 Exposure to high school algebra

In my high school I was introduced to basic algebra. We studied identities of the form

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$a^2 - b^2 = (a + b)(a - b)$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$$

The expression given in Equation (1) gives the following.

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (1)$$

Theorem 3.1. The quadratic equation $a^2 + bx + c = 0$, where $a, b, c \in R$ and $a \neq 0$, has

1. two solutions if the discriminant $b^2 - 4ac$

- two real solutions if $b^2 - 4ac > 0$, and
- two complex (imaginary) solutions if $b^2 - 4ac < 0$.

(a) a unique real solution if $b^2 - 4ac = 0$.

Proof. It is an easy exercise.

3.2 Greek: the new alphabet

In Mathematics, we started seeing Greek letters like $\alpha, \beta, \gamma, \delta, \epsilon, \theta, \rho, \phi, \psi, \xi, \omega, \kappa, \chi, \Phi, \Psi, \Omega$, etc more often (than in our physics class)

3.3 Triangle and the calculations

When I was in Class IX, we were taught trigonometry. The trigonometric functions $\sin\theta, \cos\theta, \tan\theta$ etc. were mysterious. As I remember

$$\sin\theta = \frac{\text{side adjacent to } \theta}{\text{hypotenuse}}$$

in a right angled triangle.

3.4 Calculus and the calculations

Even though I enjoyed doing calculations, it was difficult to remember the derivatives and integrals of a lot of functions, even just the trigonometric functions mentioned in Section 3.3. We were asked to learn all these formulas and be ready to tell them even if we were asked while sleeping! A few from that long list of formulas are given in the following table.

#	$f(x)$	$\frac{d}{dx}f(x)$	$\int f(x)dx^*$	Comments
1	x	1	$\frac{x^2}{2}$	Easy
2	x^2	$2x$	$\frac{x^3}{3}$	Fine
3	$\sin x$	$\cos x$	$-\cos x$	Comparatively easy
4	$\cos x$	$-\sin x$	$\sin x$	Confusing with the previous
5	$\tan x$	$\sec^2 x$	$-\log \cos x $	Difficult
6	$\tan^{-1}x$	$\frac{1}{1+x^2}$	$x\tan^{-1}x - \frac{1}{2}\log(1+x^2) + c$	Impossible to remember!

In calculus, we even dealt with the following kind of functions.

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be given by

$$f(x) = \begin{cases} \frac{e^{-x^2}}{2} & \text{if } x > 0 \\ (-x)^{\frac{1}{3}} & \text{if } x < 0 \\ 0 & \text{if } x = 0 \end{cases}$$

Those days were miserable! One can refer the book of Apostol [1] or that of Rudin [4] for many more such stuff.

3.5 Matrices : the ultimate savior

This was the easiest among all the math I did throughout my life . We studied 2×2 and 3×3 square matrices of the form

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{bmatrix}$$

and 2×3 rectangular matrices like

$$C = \begin{bmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{bmatrix}$$

and even the general $m \times n$ matrix of the form

$$\begin{bmatrix} a_{1,1} & a_{1,2} & \dots & a_{1,n} \\ a_{2,1} & a_{2,2} & \dots & a_{2,n} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ a_1 & a_2 & \dots & a_3 \end{bmatrix}$$

4 A skill that I acquired from the college: \LaTeX typesetting

As part of the skill enhancement courses, in the third semester, we studied the course ‘ \LaTeX typesetting for beginners’. We were following the book authored by Stefan Kottwitz [2].

4.1 My wedding invitation

We got an exercise to prepare a wedding invitation card using *LaTeX* and I prepared the following.



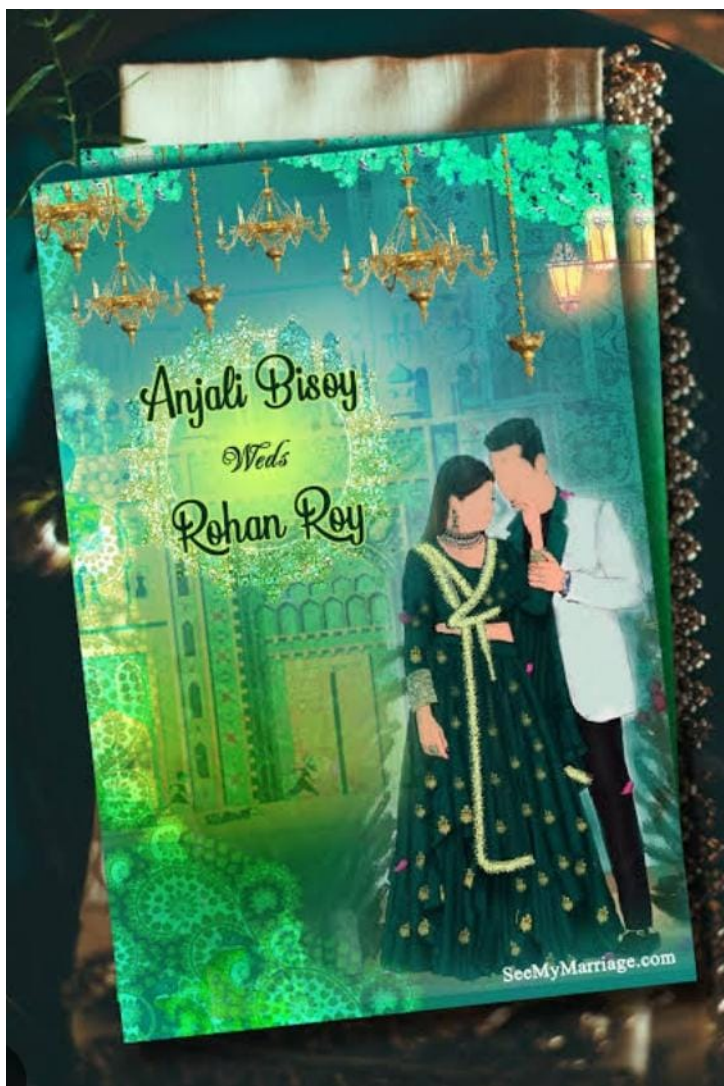


Figure 2: wedding card

Acknowledgment

I sincerely thank my fellow students for helping me complete this assignment.

References

- [1] Apostol, T.M.,1991. Calculus, Volume *John Wiley and Sons*.
- [2] Kottwitz, S.,2011. *LaTeX* beginner's guide. Packt Publishing Ltd.
- [3] Nambudiripad, K.B.M.,2014. *LaTeX* for Beginners. Narosa Publishing House, Delhi.
- [4] Rudin, W.,1964. Principles of mathematical analysis (Vol. 3). New York: McGraw-hill.