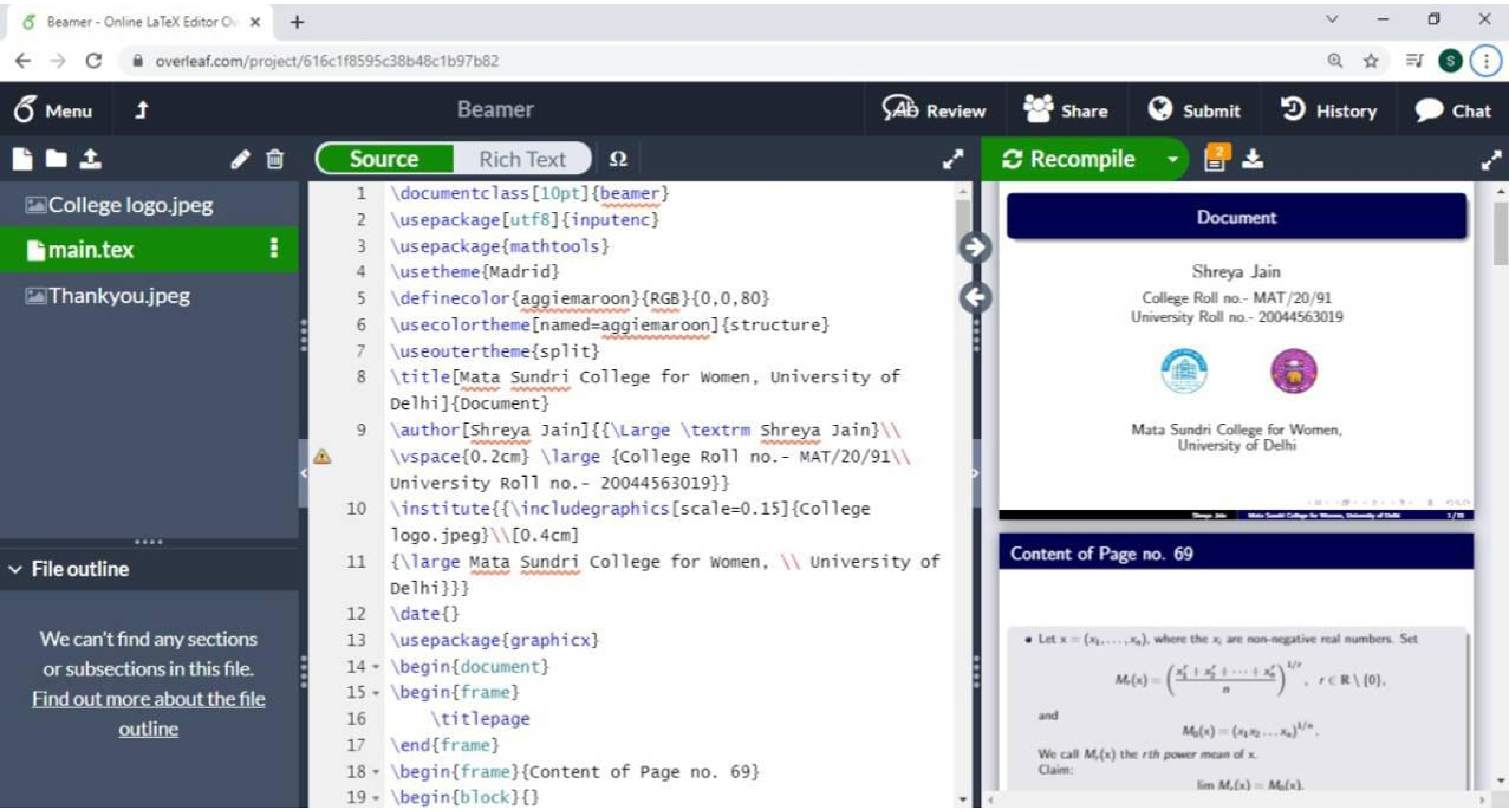
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\documentclass[10pt]{beamer}
\usepackage[utf8]{inputenc}
\usepackage{mathtools}
\usetheme{Madrid}
\definecolor{aggiemaroon}{RGB}{0,0,80}
\usecolortheme[named=aggiemaroon]{structure}
\useoutertheme{split}
\title[Mata Sundri College for Women, University of Delhi]{Document}
\author[Shreya Jain]{{\Large \textrm Shreya Jain}\\ \vspace{0.2cm} \large {College Roll no.- MAT/20/91\\ University Roll no.- 20044563019}}
\institute{{\includegraphics[scale=0.15]{College logo.jpeg}\\[0.4cm]
{\large Mata Sundri College for Women, \\ University of Delhi}}}
\date{}
\usepackage{graphicx}
\begin{document}
\begin{frame}
\titlepage
\end{frame}
\begin{frame}{Content of Page no. 69}
\begin{block}{}
Document
Shreya Jain
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University Roll no.- 20044563019
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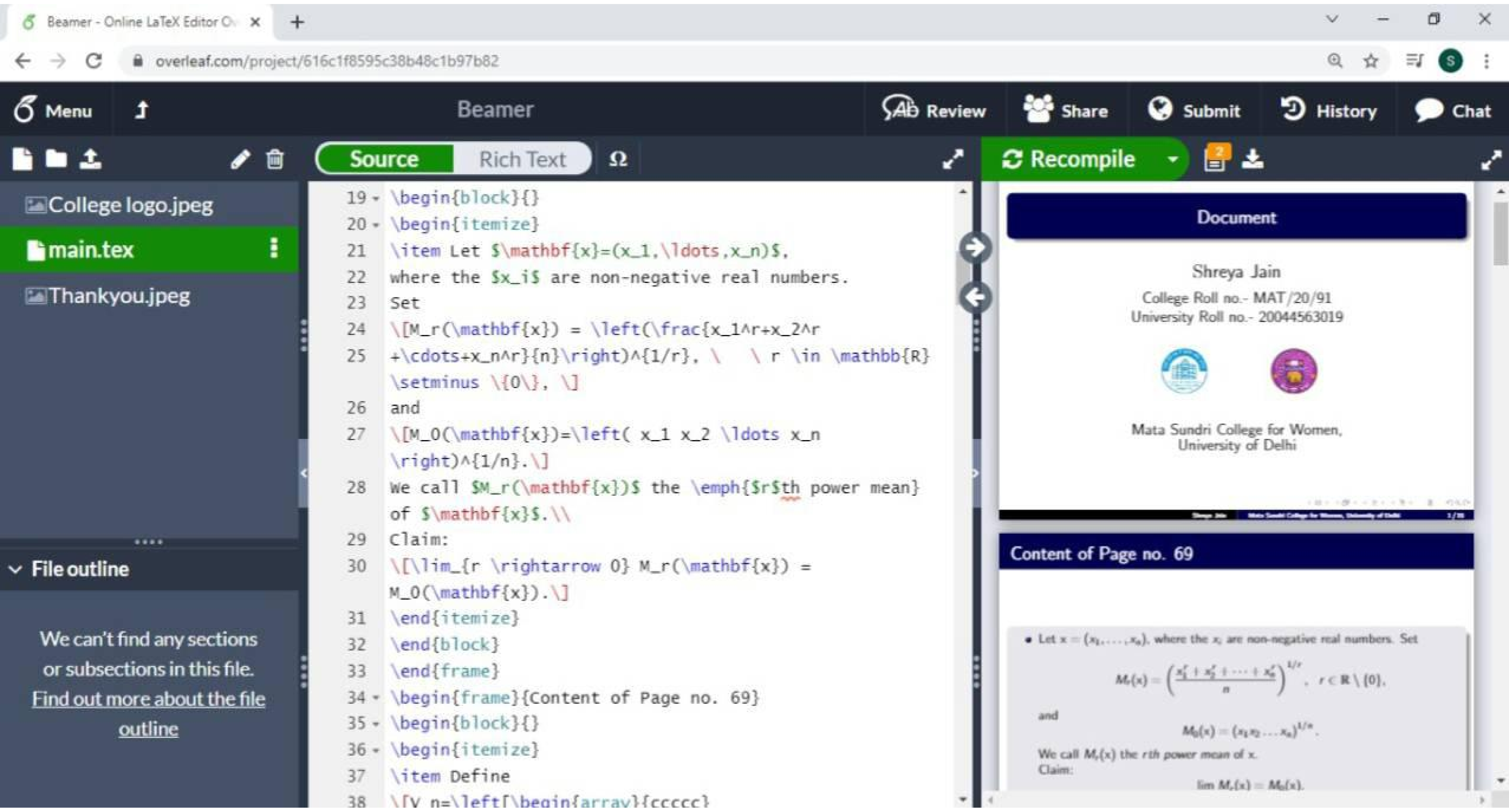
University of Delhi
Content of Page no. 69
Let x = (x1, . . . , xn), where the xi are non-negative real numbers. Set
and
We call Mr(x) the rth power mean of x.
Claim:



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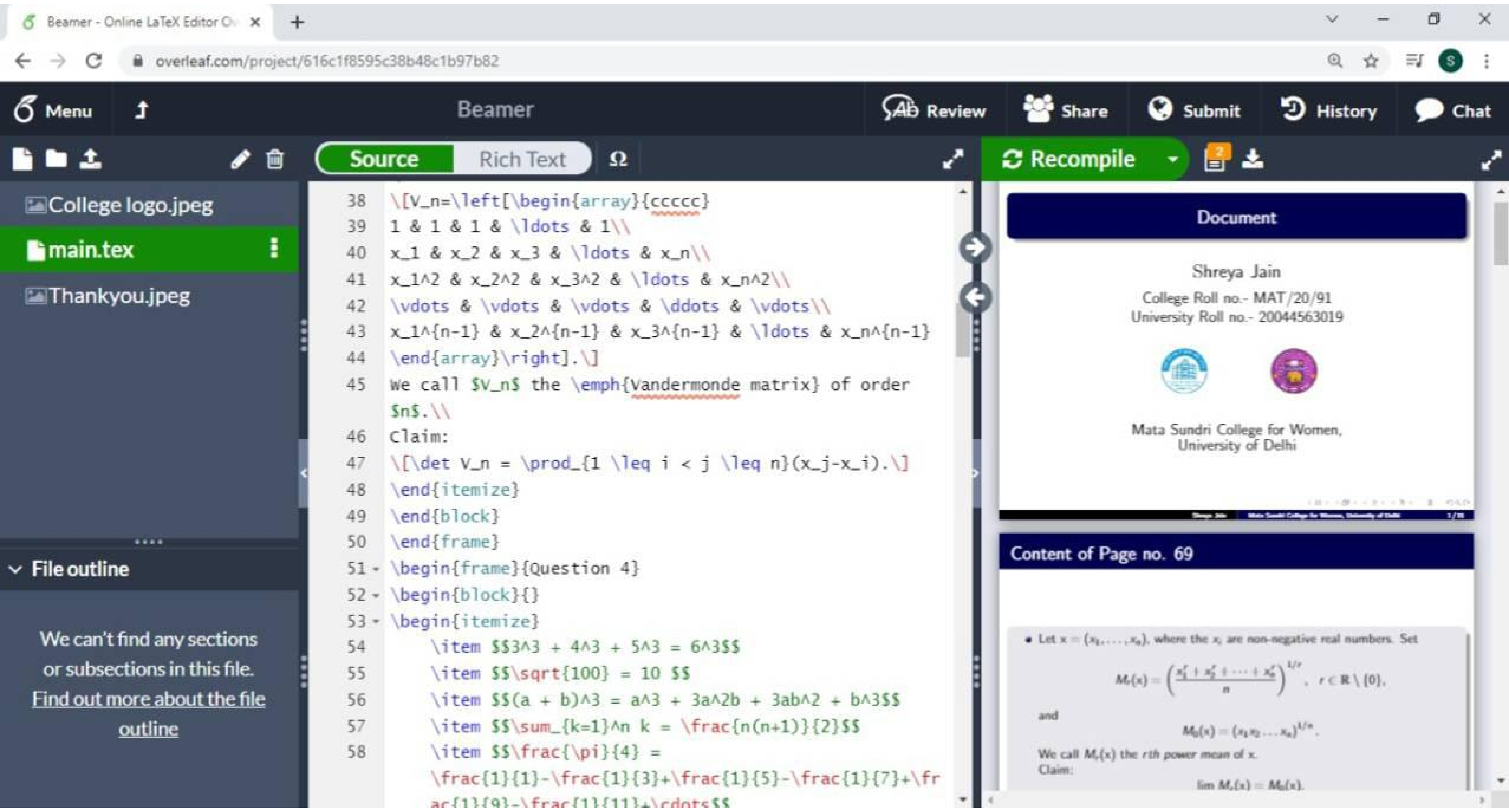
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\[V_n=\left[\begin{array}{ccccc}
1 & 1 & 1 & \ldots & 1\\
x_1 & x_2 & x_3 & \ldots & x_n\\
x_1^2 & x_2^2 & x_3^2 & \ldots & x_n^2\\
\vdots & \vdots & \vdots & \ddots & \vdots\\
x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \ldots & x_n^{n-1}
\end{array}\right].\]
We call V_n the \emph{Vandermonde matrix} of order n.\\
Claim:
\[\det V_n = \prod_{1 \leq i < j \leq n}(x_j-x_i).\]
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Question 4}
\begin{block}{}
\begin{itemize}
\item $$3^3 + 4^3 + 5^3 = 6^3$$
\item $$\sqrt{100} = 10 $$
\item $$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$
\item $$\sum_{k=1}^n k = \frac{n(n+1)}{2}$$
\item $$\frac{\pi}{4} = \frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\cdots$$
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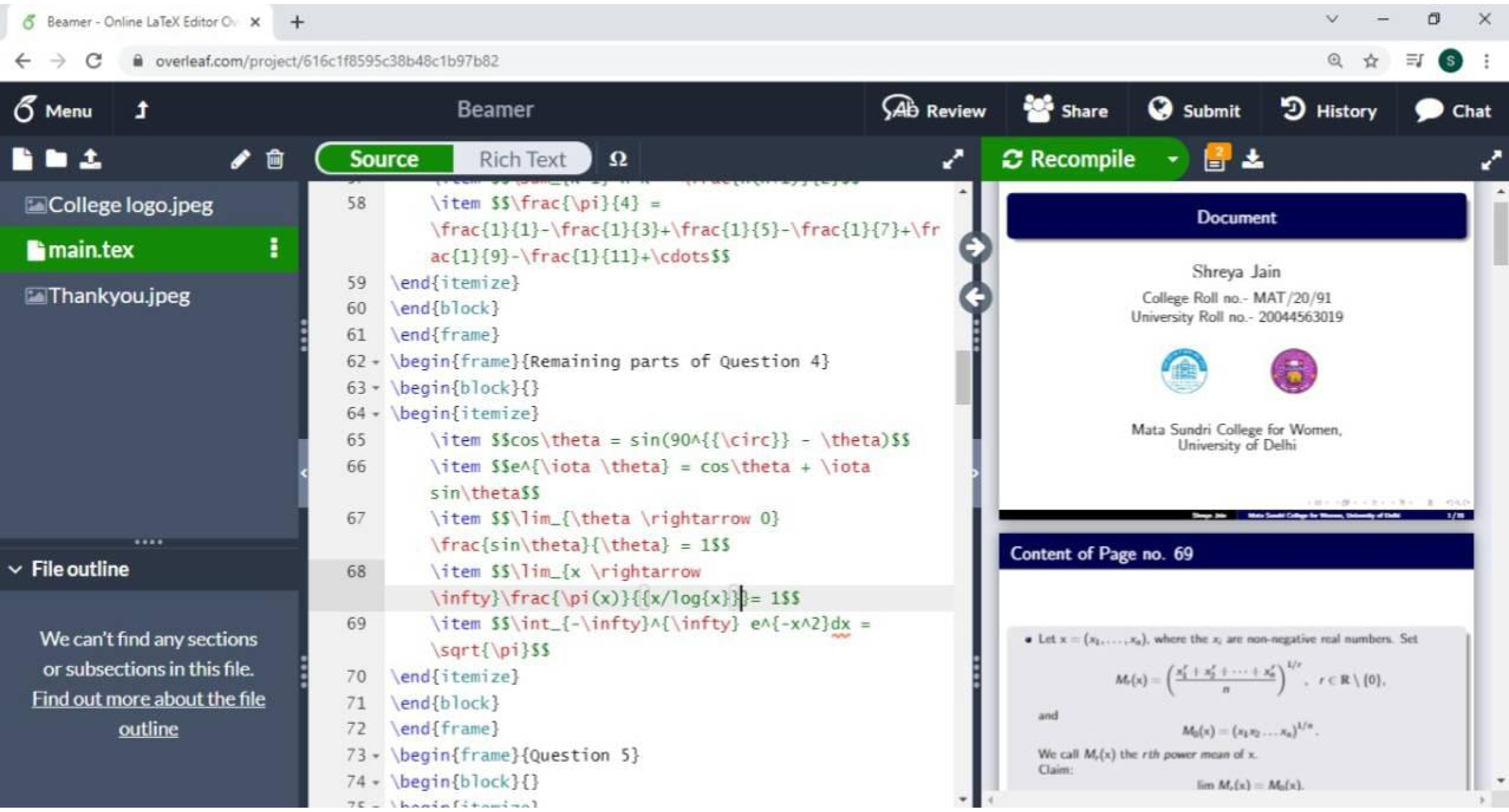
and
We call Mr(x) the rth power mean of x.
Claim: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\item $$\frac{\pi}{4} = \frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\cdots$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Remaining parts of Question 4}
\begin{block}{}
\begin{itemize}
\item $$cos\theta = sin(90^{{\circ}} - \theta)$$
\item $$e^{\iota \theta} = cos\theta + \iota sin\theta$$
\item $$\lim_{\theta \rightarrow 0} \frac{sin\theta}{\theta} = 1$$
\item $$\lim_{x \rightarrow \infty}\frac{\pi(x)}{{x/log{x}}}= 1$$
\item $$\int_{-\infty}^{\infty} e^{-x^2}dx = \sqrt{\pi}$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Question 5}
\begin{block}{}
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and
We call Mr(x) the rth power mean of x.
Claim:

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\begin{block}{}
\begin{itemize}
    \item Positive numbers $a$, $b$, and $c$ are the
    side lengths of a triangle if and only if $a+b >
    c$, $b+c > a$, and $c+a > b$.
    \item The area of a triangle with side lengths $a$,
    $b$, $c$ is given by $Heron's \ \ formula:$\\
    $$A = \sqrt{s(s-a)(s-b)(s-c)}, $$\\
    where $s$ is the semiperimeter ${(a+b+c)/2}$.
    \item The volume of a regular tetrahedron of edge
    length $1$ is $\sqrt2/12$.
    \item The quadratic equation $ax^2 + bx + c = 0$
    has roots $$r_1,r_2 = \frac{-b \pm \sqrt{b^2 -
    4ac}}{2a}$$.
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Remaining Parts of Question 5}
\begin{block}{}
\begin{itemize}
    \item The derivative of a function $f$, denoted
    $f'$, is defined by $$f'(x) = \lim_{h \rightarrow
    o}\frac{f(x+h)-f(x)}{h}$$.
```

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- Let $x = (x_1, \ldots, x_n)$, where the x_i are non-negative real numbers. Set

$$M_r(x) = \left(\frac{x_1^r + x_2^r + \cdots + x_n^r}{n}\right)^{1/r}, \quad r \in \mathbb{R} \setminus \{0\},$$

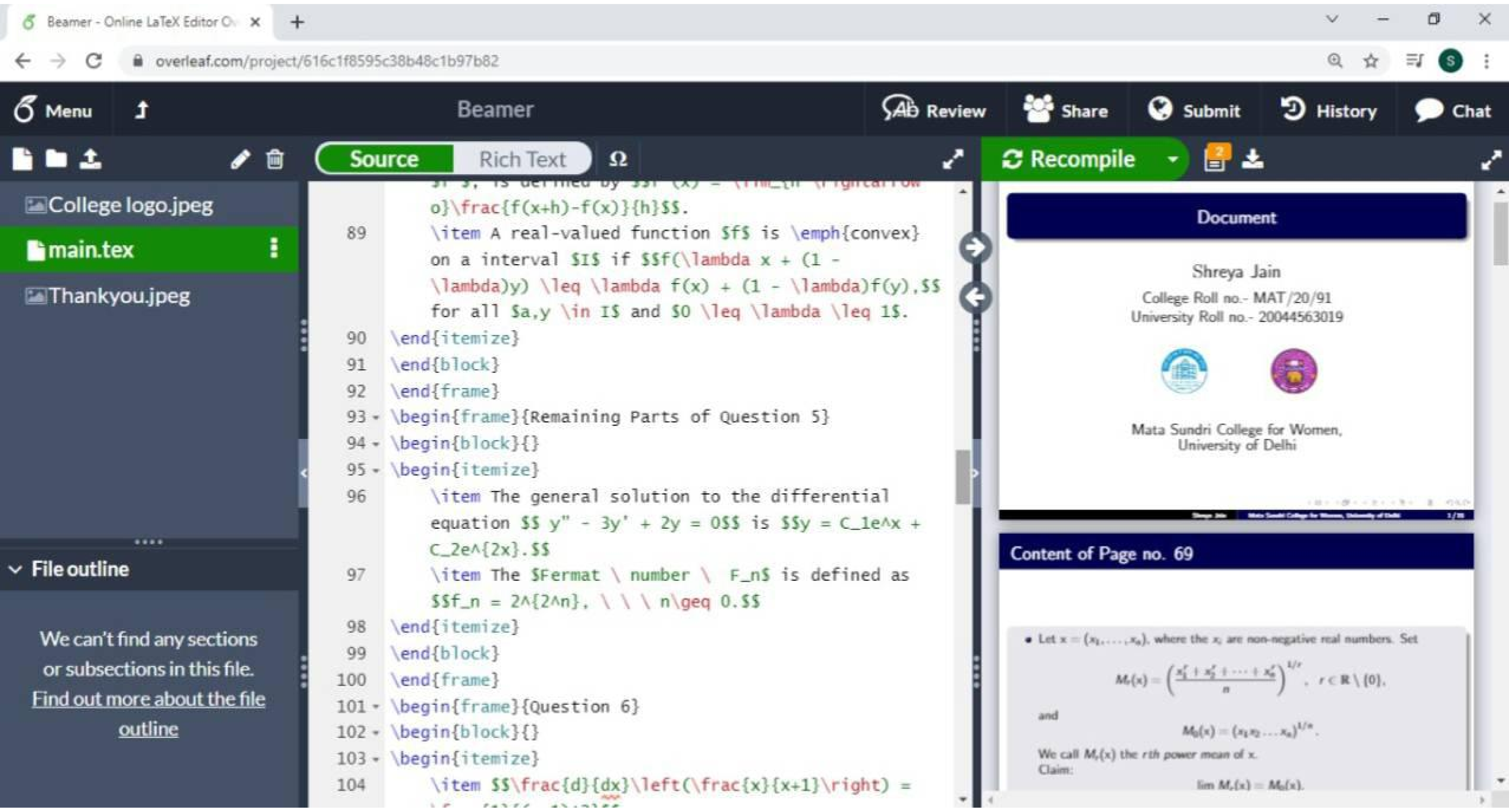
and

$$M_0(x) = (x_1 x_2 \ldots x_n)^{1/n}.$$

We call $M_r(x)$ the rth power mean of x.

Claim:

$$\lim M_r(x) = M_0(x).$$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o}\frac{f(x+h)-f(x)}{h}$$.
89 \item A real-valued function f is \emph{convex} on a interval I if $$f(\lambda x + (1 - \lambda)y) \leq \lambda f(x) + (1 - \lambda)f(y),$$ for all $a,y \in I$ and $0 \leq \lambda \leq 1$.
90 \end{itemize}
91 \end{block}
92 \end{frame}
93 \begin{frame}{Remaining Parts of Question 5}
94 \begin{block}{}
95 \begin{itemize}
96 \item The general solution to the differential equation $$ y" - 3y' + 2y = 0$$ is $$y = C_1e^x + C_2e^{2x}.$$
97 \item The $Fermat \ number \ F_n$ is defined as $$f_n = 2^{2^n}, \ \ \ n\geq 0.$$
98 \end{itemize}
99 \end{block}
100 \end{frame}
101 \begin{frame}{Question 6}
102 \begin{block}{}
103 \begin{itemize}
104 \item $$\frac{d}{dx}\left(\frac{x}{x+1}\right) =
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and
Claim:

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```latex
\begin{itemize}
    \item $$\frac{d}{dx}\left(\frac{x}{x+1}\right) =
    \frac{1}{(x+1)^2}$$
    \item $$\lim_{n \rightarrow
    \infty}\left(1+\frac{1}{n}\right)^n = e$$
    \item $$\left| \begin{array}{cc}
a & b \\
c & d
\end{array}\right| = ad - bc$$
     \item $$R_\theta = \left[\begin{array}{cc}
cos\theta & -sin \theta \\
sin \theta & cos \theta
\end{array}\right]$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Remaining Parts of Question 6}
\begin{block}{}
\begin{itemize}
    \item $$\left| \begin{array}{ccc}
\textbf{i} & \textbf{j} & \textbf{k} \\
a_1 & a_2 & a_3 \\
b_1 & b_2 & b_3
\end{array}\right| = \left|\begin{array}{cc}
```

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- Let $x = (x_1, \ldots, x_n)$, where the x_i are non-negative real numbers. Set

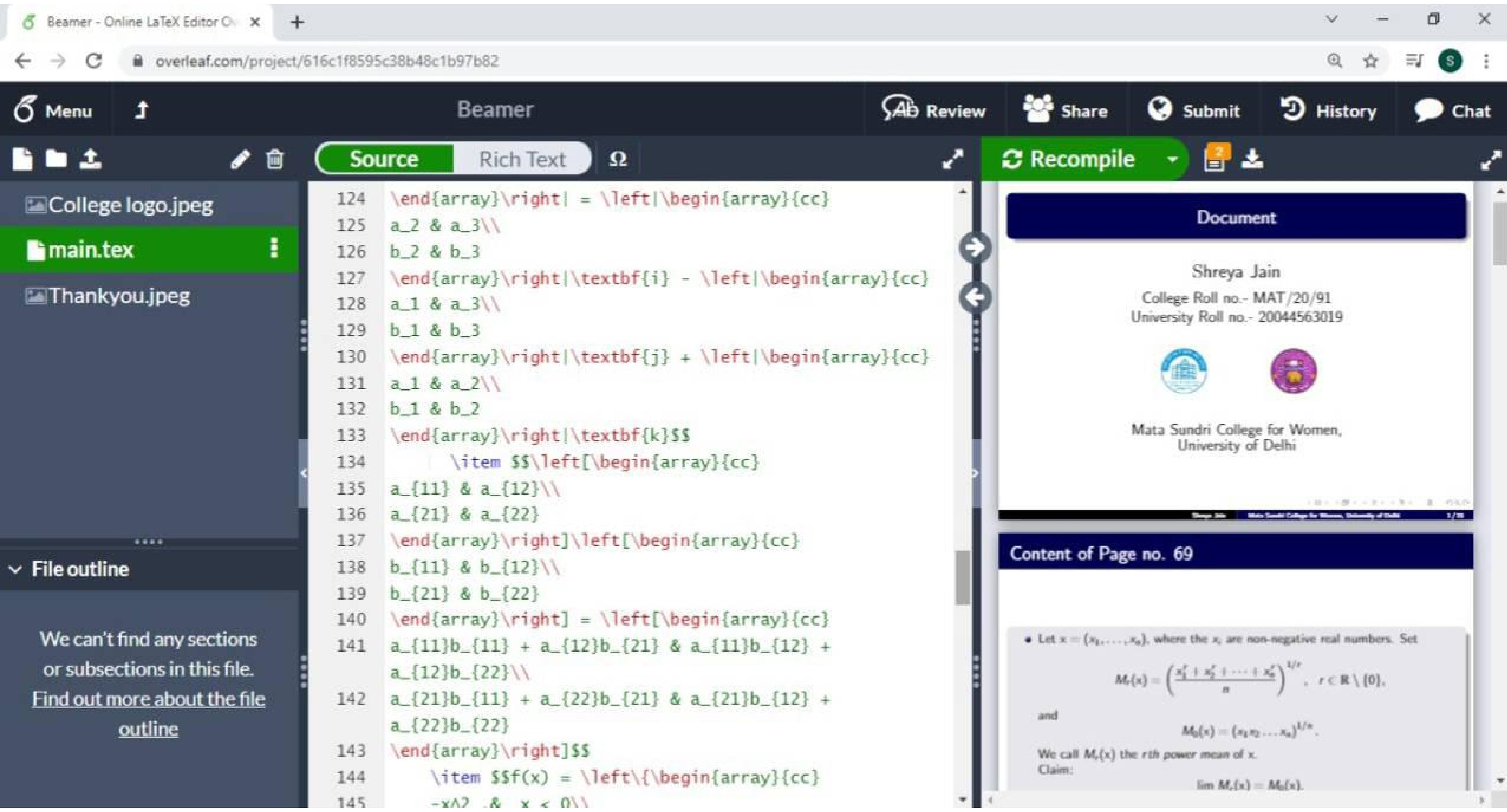
$$M_r(x) = \left(\frac{x_1^r + x_2^r + \cdots + x_n^r}{n}\right)^{1/r}, \quad r \in \mathbb{R} \setminus \{0\},$$

and

$$M_0(x) = (x_1 x_2 \ldots x_n)^{1/n}.$$

We call $M_r(x)$ the *rth power mean* of x.
Claim:

$$\lim M_r(x) = M_0(x).$$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\end{array}\right| = \left|\begin{array}{cc}
a_2 & a_3\\
b_2 & b_3
\end{array}\right|\textbf{i} - \left|\begin{array}{cc}
a_1 & a_3\\
b_1 & b_3
\end{array}\right|\textbf{j} + \left|\begin{array}{cc}
a_1 & a_2\\
b_1 & b_2
\end{array}\right|\textbf{k}$$
\item $$\left[\begin{array}{cc}
a_{11} & a_{12}\\
a_{21} & a_{22}
\end{array}\right]\left[\begin{array}{cc}
b_{11} & b_{12}\\
b_{21} & b_{22}
\end{array}\right] = \left[\begin{array}{cc}
a_{11}b_{11} + a_{12}b_{21} & a_{11}b_{12} + a_{12}b_{22}\\
a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} + a_{22}b_{22}
\end{array}\right]$$
\item $$f(x) = \left\{\begin{array}{cc}
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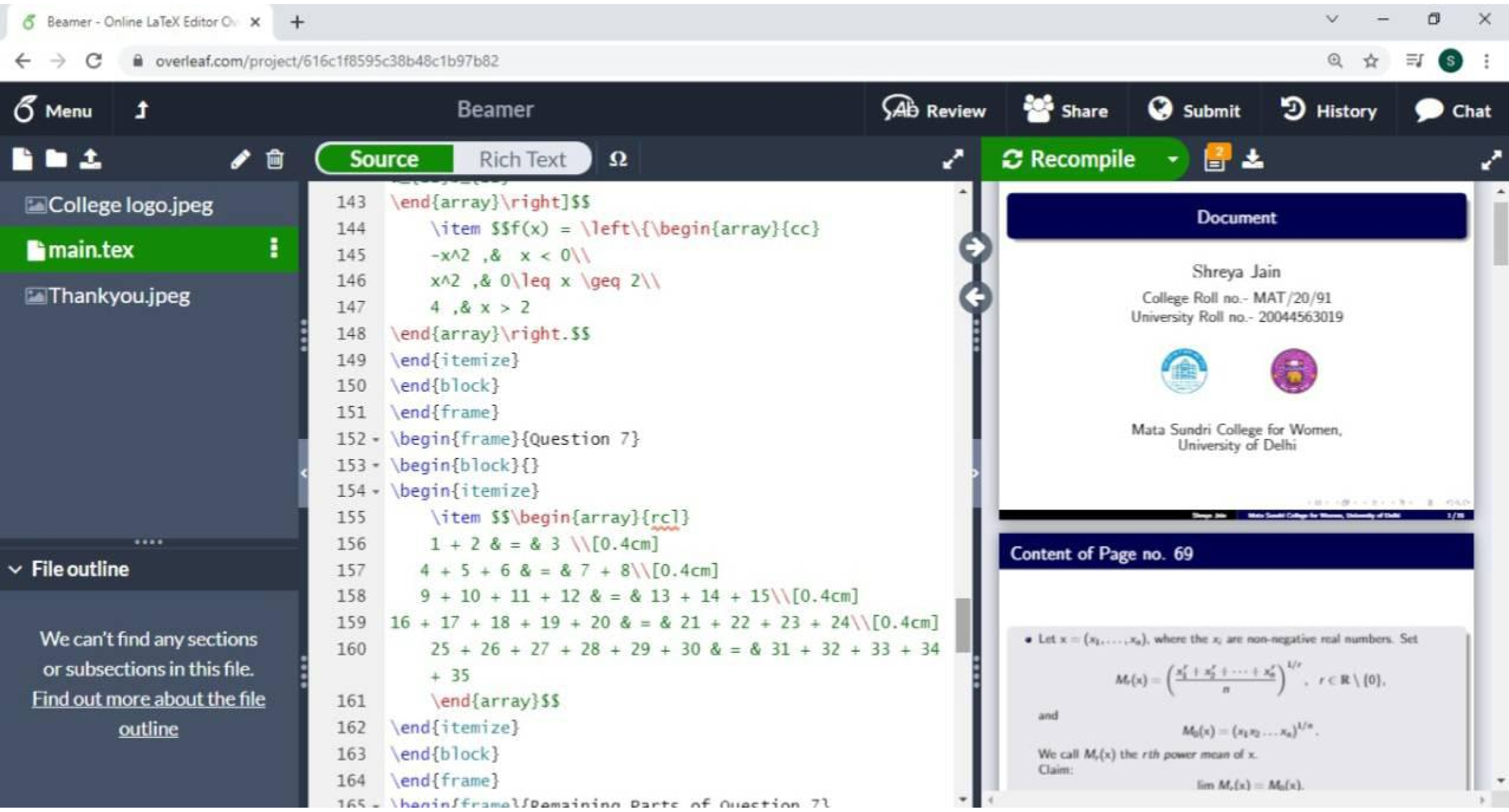
Let x = (x1, . . . , xn), where the xi are non-negative real numbers. Set
and
We call Mr(x) the rth power mean of x.
Claim: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\end{array}\right]$$
\item $$f(x) = \left\{\begin{array}{cc}
-x^2 ,& x < 0\\
x^2 ,& 0\leq x \geq 2\\
4 ,& x > 2
\end{array}\right.$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Question 7}
\begin{block}{}
\begin{itemize}
\item $$\begin{array}{rcl}
1 + 2 & = & 3 \\[0.4cm]
4 + 5 + 6 & = & 7 + 8\\[0.4cm]
9 + 10 + 11 + 12 & = & 13 + 14 + 15\\[0.4cm]
16 + 17 + 18 + 19 + 20 & = & 21 + 22 + 23 + 24\\[0.4cm]
25 + 26 + 27 + 28 + 29 + 30 & = & 31 + 32 + 33 + 34 + 35
\end{array}$$
\end{itemize}
\end{block}
\end{frame}
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Let x = (x1, ..., xn), where the xi are non-negative real numbers. Set
and
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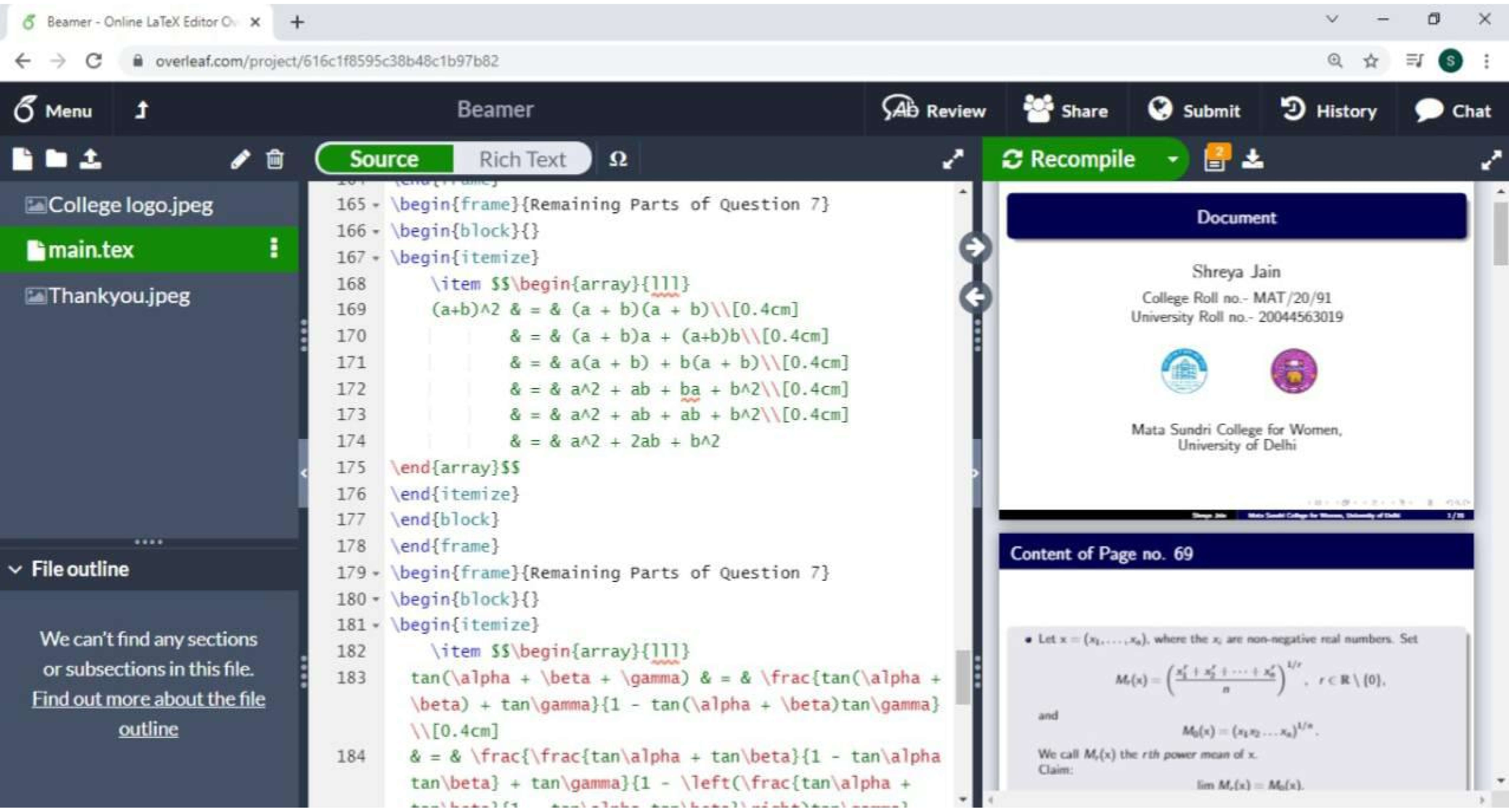

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\begin{frame}{Remaining Parts of Question 7}
\begin{block}{}
\begin{itemize}
\item $$\begin{array}{lll}
(a+b)^2 & = & (a + b)(a + b)\\[0.4cm]
& = & (a + b)a + (a+b)b\\[0.4cm]
& = & a(a + b) + b(a + b)\\[0.4cm]
& = & a^2 + ab + ba + b^2\\[0.4cm]
& = & a^2 + ab + ab + b^2\\[0.4cm]
& = & a^2 + 2ab + b^2
\end{array}$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Remaining Parts of Question 7}
\begin{block}{}
\begin{itemize}
\item $$\begin{array}{lll}
tan(\alpha + \beta + \gamma) & = & \frac{tan(\alpha + \beta) + tan\gamma}{1 - tan(\alpha + \beta)tan\gamma}\\[0.4cm]
& = & \frac{\frac{tan\alpha + tan\beta}{1 - tan\alpha tan\beta} + tan\gamma}{1 - \left(\frac{tan\alpha +
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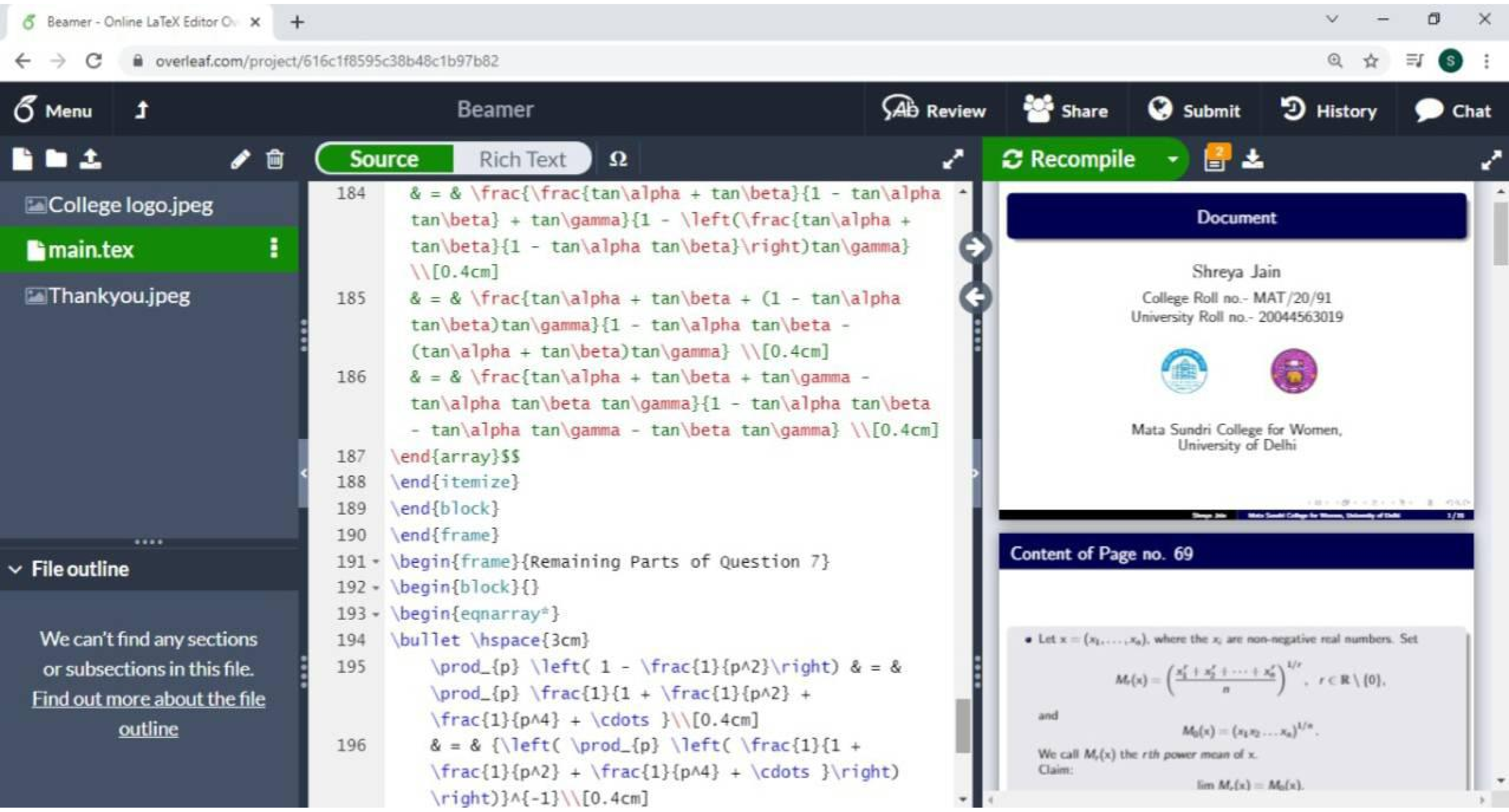
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& = & \frac{\frac{tan\alpha + tan\beta}{1 - tan\alpha tan\beta} + tan\gamma}{1 - \left(\frac{tan\alpha + tan\beta}{1 - tan\alpha tan\beta}\right)tan\gamma} \\[0.4cm]
& = & \frac{tan\alpha + tan\beta + (1 - tan\alpha tan\beta)tan\gamma}{1 - tan\alpha tan\beta - (tan\alpha + tan\beta)tan\gamma} \\[0.4cm]
& = & \frac{tan\alpha + tan\beta + tan\gamma - tan\alpha tan\beta tan\gamma}{1 - tan\alpha tan\beta - tan\alpha tan\gamma - tan\beta tan\gamma} \\[0.4cm]
\end{array}$$
\end{itemize}
\end{block}
\end{frame}
\begin{frame}{Remaining Parts of Question 7}
\begin{block}{}
\begin{eqnarray*}
\bullet \hspace{3cm}
\prod_{p} \left(1 - \frac{1}{p^2}\right) & = & \prod_{p} \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots }\\[0.4cm]
& = & {\left(\prod_{p} \left(\frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots }\right) \right)}^{-1}\\[0.4cm]
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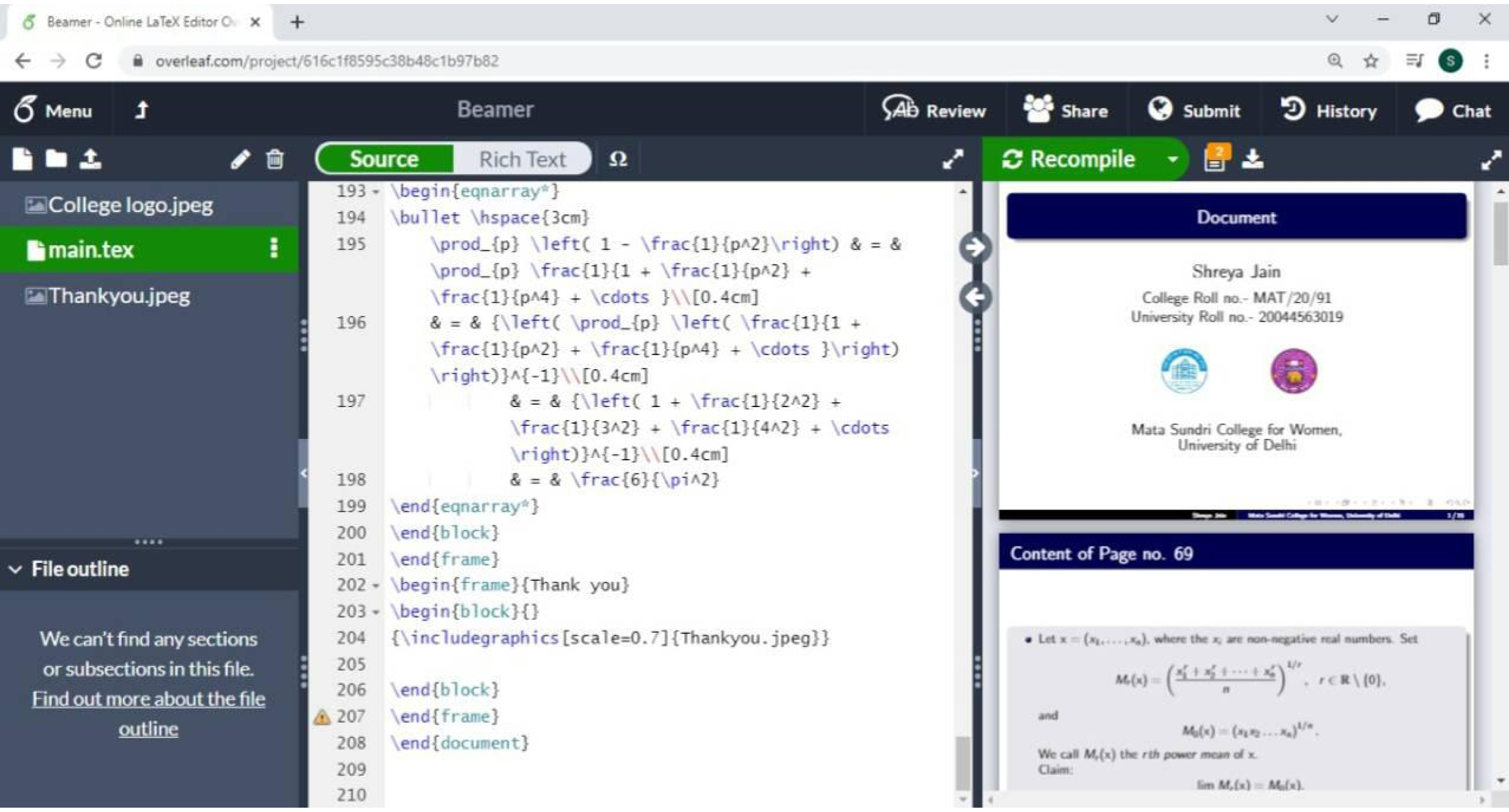
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\begin{eqnarray*}
\bullet \hspace{3cm}
\prod_{p} \left(1 - \frac{1}{p^2}\right) & = & \prod_{p} \frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots }\\[0.4cm]
& = & {\left(\prod_{p} \left(\frac{1}{1 + \frac{1}{p^2} + \frac{1}{p^4} + \cdots }\right) \right)}^{-1}\\[0.4cm]
& = & {\left(1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \cdots \right)}^{-1}\\[0.4cm]
& = & \frac{6}{\pi^2}
\end{eqnarray*}
\end{block}
\end{frame}
\begin{frame}{Thank you}
\begin{block}{}
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\end{block}
\end{frame}
\end{document}
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