ASSIGNMENT 2

Review

Source | Rich Text

```
\documentclass{beamer}
\usepackage[utf8]{inputenc}
\usepackage{graphicx}
\usepackage{xcolor}
\setbeamertemplate{background}{\includegraphics[width=\paperwidth,height=\paperheight]{bg1.png}}
\usetheme{AnnArbor}
\title{\textbf{ASSIGNMENT 2}}
\author{\texttt{CHESHTA}\and\hspace{2in} \textcolor{blue}{MAT/20/92}\and\hspace{2in}
\textcolor{blue}{20044563015}}
\date{}
\begin{document}
\begin{frame}
\begin{minipage}{0.13\linewidth}
\includegraphics[width=2cm,height=2cm]{msc.png}
\end{minipage}\hfill
\begin{minipage}{0.7\linewidth}
\centering\bfseries MATA SUNDRI COLLEGE FOR WOMEN\\
(UNIVERSITY OF DELHI)
\end{minipage}\hfill
\begin{minipage}{0.13\linewidth}
\includegraphics[width=2cm,height=2cm]{du.png}
\end{minipage}
\Huge\titlepage
\end{frame}
\begin{frame}{Table of Contents}
\begin{center}
\LARGE\begin{tabular}{ |c|c| }
\hline
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\textcolor{blue}{\textbf{Slide No.}}&\textcolor{blue}{\textbf{Content}}\\
 \hline
 \hline
3&Page 69 - Part 1\\
 \hline
4&Page 69 - Part 2\\
 \hline
5,6&Question 4\\
\hline
7-9&Question 5\\
\hline
10,11&Question 6\\
\hline
12-15&Question 7\\
\hline
\end{tabular}
\end{center}
\end{frame}
\begin{frame}{Page 69 - Part 1}
\textbf{1.} Let $\mathbf{x}=(x_1,\ldots,x_n)$,where the $x_i$ are non-negative real numbers. Set\\
$$M_r(\mathbf{x})=\left(\frac{x_1^r+x_2^r+\cdots+x_n^r}{n}\right)^\frac{1}{r},r\in \mathbf{R}\setminus \{0\},$$\\
and $$M_0(\mathbf{x})=(x_1 x_2 \ldots x_n)^\frac{1}{n}.$$\\
We call $M_r(x)$ the \emph{rth power mean} of $\mathbf{x}$.\\
Claim:$$\lim_{r\rightarrow0}M_r(\mathbf{x})=M_0(\mathbf{x}).$$

\end{frame}
\begin{frame}{Page 69 - Part 2}
\textbf{2.}\;Define
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$$V_n=\left[\begin{array}{ccccc}
1&1&1&\cdots&1  \\
x_1&x_2&x_3&\cdots&x_n\\
x_1^2&x_2^2&x_3^2&\cdots&x_n^2\\
\vdots&\vdots&\vdots&\ddots&\vdots\\
x_1^{n-1}&x_2^{n-1}&x_3^{n-1}&\cdots&x_n^{n-1}\\
\end{array}\right]$$
 We call $V_n$ the Vandermonde matrix of order $n$.\\
Claim:$$detV_n=\prod_{1\leq i < j \leq n}\left(x_j-x_i\right)$$
\end{frame}
\begin{frame}{Question 4}
\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$$\sum^n_{k=1} k=\frac{n(n+1)}{2}$$\\
\item$$\frac{\pi}{4}=\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\cdots$$\\
\end{itemize}
\end{frame}
\begin{frame}
\begin{itemize}
\item$$\cos\theta=\sin(90^o-\theta)$$
\item$$e^{i\theta}=\cos\theta+i\sin\theta$$
\item$$\lim_{\theta\rightarrow0} \frac{\sin\theta}{\theta}=1$$
\item$$\lim_{x\rightarrow\infty}\; \frac{\pi(x)}{x\setminus\log{x}}=1$$
\item$$\int_{-\infty}^{\infty} e^{-x^2} dx=\sqrt{\pi}$$
\end{itemize}
\end{frame}
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\begin{frame}{Question 5}
\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 $c+a>b$.\\
\vspace{0.2in}
\item The area of a triangle with side lengths $a,b$ and $c$ is given by \emph{Heron's formula}:
$$A=\sqrt{s(s-a)(s-b)(s-c)},$$
where $s$ is the semi perimeter $\frac{a+b+c}{2}$\\
\vspace{0.2in}
\item The volume of a regular tetrahedron of edge length 1 is $\frac{\sqrt{2}}{12}$.
\end{itemize}
\end{frame}
\begin{frame}
\begin{itemize}
\item The quadratic equation $ax^2+bx+c=0$ has roots$$r_1,r_2=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$
\vspace{0.2in}
\item The \emph{derivative} of a function $f$,denoted $f'$,is defined by $$f'(x)=\lim_{h\rightarrow0} \frac{f(x+h)-f(x)}{h}$$
\vspace{0.2in}
\item A real-valued function $f$ is \emph{convex} on an interval $I$ if $$f(\lambda x+(1-\lambda)y)\leq f(x)+(1=\lambda)f(y),$$\\
for all $x,y \in I$ and $0\leq \lambda\leq 1.$
\end{itemize}
\end{frame}
\begin{frame}
 \begin{itemize}
\item The general solution to the differential  equation $$y''-3y'+2y=0$$is$$y=C_1 e^x +C_2 e^{2x}$$
\vspace{0.2in}
\item The \emph{Fermat number} $F_n$ is defined as $$F_n=2^{2^n},n\geq 0.$$
\end{itemize}
\end{frame}
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\begin{frame}{Question 6}
\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{frame}
\begin{frame}
\begin{itemize}
\item $$\left|\begin{array}{ccc}
\textbf{i}&\textbf{j}&\textbf{k}\\
a_1&a_2&a_3\\
b_1&b_2&b_3
\end{array}\right|=\left|\begin{array}{cc}
a_2&a_3\\
b_2&b_3
\end{array}\right|\textbf{i}-\left|\begin{array}{cc}
a_1&a_3\\
b_1&b_3
\end{array}\right|\textbf{j}+\left|\begin{array}{cc}
a_1&a_2\\
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b_1&b_2
\end{array}\right|\textbf{k}$$
\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 $$f(x)=\left\{\begin{array}{cl}
-x^2,&x<0\\
x^2,&0\leq x\leq 2\\
4,&x>2
\end{array}\right.$$
\end{itemize}
\end{frame}
\begin{frame}{Question 7- PART 1}
\begin{block}{}
\textbf{1.}
\begin{eqnarray*}
1+2&=&3\\
4+5+6&=&7+8\\
9+10+11+12&=&13+14+15\\
16+17+18+19+20&=&21+22+23+24\\
25+26+27+28+29+30&=&31+32+33+34+35\\
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\end{eqnarray*}
\end{block}
\end{frame}
\begin{frame}{PART 2}
\begin{block}{}
\textbf{2.}
\begin{eqnarray*}
(a+b)^2&=&(a+b)(a+b)\\
&=&(a+b)a+(a+b)b\\
&=&a(a+b)+b(a+b)\\
&=&a^2+ab+ba+b^2\\
&=&a^2+ab+ab+b^2\\
&=&a^2+2ab+b^2
\end{eqnarray*}
\end{block}
\end{frame}
\begin{frame}{PART 3}
\begin{block}{}
\textbf{3.}
\begin{eqnarray*}
\tan(\alpha+\beta+\gamma)&=&\frac{\tan(\alpha+\beta)+\tan\gamma}{1-\tan(\alpha+\beta) \tan\gamma}\\
&=&\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}\\
&=&\frac{\tan\alpha+\tan\beta+(1-\tan\alpha \tan\beta)\tan\gamma}{1-\tan\alpha \tan\beta-(\tan\alpha+\tan\beta)\tan\gamma}\\
&=&\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}
\end{eqnarray*}
\end{block}
\end{frame}
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\begin{frame}{PART 4}
\begin{block}{}
\textbf{4.}
\begin{eqnarray*}
\prod_{p} \left(1-\frac{1}{p^2}\right)&=&\prod_{p} \frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\cdots}\\
&=&\left(\prod_{p} \left(1+\frac{1}{p^2}+\frac{1}{p^4}+\cdots\right)\right)^{-1}\\
&=&\left(1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots\right)^{-1}\\
&=&\frac{6}{\pi^2}
\end{eqnarray*}
\end{block}
\end{frame}
\begin{frame}
\includegraphics[width=12cm,height=8cm]{thank you.jpg}
\end{frame}
\end{document}
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