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\documentclass{beamer}
\usepackage[utf8]{inputenc}
\usepackage{kerkis}
\usepackage{tcolorbox}

\title{ASSIGNMENT 2}
\subtitle{\LaTeX Presentation}
\author{Ritika Kamboj \\ MAT/20/122\\ 20044563047}
\date{}
\institute{Mata Sundri College For Women \\University of Delhi}

\usetheme{Berlin}
  \usecolortheme{beaver}
  \usefonttheme{serif}


\begin{document}
{\setbeamertemplate{background}{\includegraphics[width=\paperwidth,height=\paperheight]{background.jpeg}}
\begin{frame}
 \titlepage

\end{frame}
\begin{frame}
     \frametitle{Content of the page number 69}
\begin{enumerate}
    \item
    Let $\mathbf{x}={x_1,\dots,x_n}$, where the $x_i$ are non-negative real numbers.
    Set
    \[M_r(\mathbf{x})=\left(\frac{x_1^r+x_2^r+\cdots+x_n^r}{n}\right)^{1/r},
    \;\; r\in \mathbf{R} \setminus \{0\},\]
    and
    \[ M_0(\mathbf{x})=\left(x_1x_2\cdots x_n\right)^{1/n}.\]
    We call $M_r(\mathbf{x})$ the \em{$r^{th}$ power mean} of $\mathbf{x}$. \\
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    We call $M_r(\mathbf{x})$ the \em{$r^{th}$ power mean} of $\mathbf{x}$. \\
    Claim:
    \[\lim_{r\rightarrow 0} M_r(\mathbf{x})=M_0(\mathbf{x})\].
    \item
    Define
    \end{enumerate}
\end{frame}
\begin{frame}
\[V_n=
    \left[
    \begin{array}{ccccc}
        1 & 1 & 1 & \cdots & 1  \\
    x_1 &  x_2 &  x_3 & \cdots & x_n  \\
    x_1^2 &  x_2^2 &  x_3^2 & \cdots & x_n^2  \\
    \vdots & \vdots  & \vdots & \ddots & \vdots  \\
    x_1^{n-1} &  x_2^{n-1} &  x_3^{n-1} & \cdots & x_n^{n-1}
    \end{array}
    \right]\]
    We call $V_n$ the \emph{Vandermonde matrix} of order n.\\
    Claim:\[\det V_n=\prod_{1\leq i <j \leq n} \left(x_j-x_i \right)\]
\end{frame}
\begin{frame}{Question. 4}
   \begin{itemize}
   \begin{tcolorbox}
   \item \[3^3+4^3+5^3=6^3 \]\end{tcolorbox}\\
   \item \[\sqrt{100}=10\]\\
   \item \[\left(a+b \right)^3 =a^3+b^3+3a^2 b+3ab^2\]\\
   \item \[\sum_{k=1}^{n}k = \frac{n(n+1)}{2}\]\\
   \item \[\frac{\pi}{4}=\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\dots\]
   \end{itemize}
\end{frame}
\begin{frame}{Remaining parts of Ques.4}
   \begin{itemize}
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\begin{frame}{Remaining parts of Ques.4}
  \begin{itemize}
    \item \[\cos\theta=\sin(90^\circ-\theta)\]\\
    \item \[e^{i\theta}=\cos\theta+i\sin\theta\]\\
    \item \[\lim_{x\rightarrow\infty}\frac{\sin\theta}{\theta}=1\]\\
    \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{frame}
\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$.
      \item The area of a triangle with side lengths a,b,c is given by \emph{Heron's formula}:
      \[\mathbf{A}= \sqrt{s(s-a)(s-b)(s-c)},\]
      where \emph{s} is the semiperimeter (a+b+c)/2.
      \item The volume of a regular tetrehedron of edge length 1 is $\sqrt{2}/12$.
      \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{frame}
\begin{frame}{Remaining Parts of Ques.5}
    \begin{itemize}
     \item The \emph{derivative} of a function \emph{f} , denoted \emph{f'} , is defined by \[f'(x)=\lim_{h\rightarrow 0} \frac{f(x+h)-f(x)}{h}.\]
     \item A real-valued function \emph{f} is \emph{convex} on an interval \emph{I} if \[f(\lambda x +(1-\lambda)y)\le \lambda\: f(x)+(1-\lambda)\:f(y),\]
     for all x,y \(\in I\: and\: 0\le\lambda\le 1 \)
     \item The general solution to the differential equation \[y''-3y'+2y=0\]is\[y=C_1e^x+C_2e^{2x}.\]
  \end{itemize}
\end{frame}
\begin{frame}{Remaining part of Ques.5}
 \begin{itemize}

     \item The \emph{Fermat number} $F_n$ is defined as \[F_n=2^{2^n}, n \ge 0.\]
 \end{itemize}
\end{frame}
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\end{frame}
\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 \[\begin{vmatrix}a & b\\c & d \end{vmatrix}= ad-bc\]
    \item \[R_\theta = \begin{bmatrix} \cos\theta & -\sin\theta\\\sin\theta & \cos\theta\end{bmatrix}\]
 \end{itemize}
\end{frame}
\begin{frame}{Remaining Parts of Ques.6}
\begin{itemize}
    \item \[\begin{vmatrix}\textbf{i}&\textbf{j}&\textbf{k}\\a_1&a_2&a_3\\b_1&b_2&b_3\end{vmatrix}= \begin{vmatrix}a_2&a_3\\b_2&b_3\end{vmatrix} \textbf{i}-\begin{vmatrix}a_1&a_3\\b_1&b_3\end{vmatrix} \textbf{j}+\begin{vmatrix}a_1&a_2\\b_1&b_2\end{vmatrix} \textbf{k}\]
    \item \[\begin{bmatrix}a_{11}&a_{12}\\a_{21}&a_{22}\end{bmatrix}\begin{bmatrix}b_{11}&b_{12}\\b_{21}&b_{22}\end{bmatrix}=\begin{bmatrix}a_{11}b_{11}+a_{12}b_{21}&a_{11}b_{12}+a_{12}b_{22}\\a_{21}b_{11}+a_{22}b_{21}&a_{21}b_{12}+a_{22}b_{22}\end{bmatrix}\]
    \item $$f(x)=\begin{cases}
    -x^2 ,\;\;x<0\\
    x^2 ,\;\; 0\leq x\leq 2\\
    4 ,\;\;x>2\end{cases}.$$
\end{itemize}
\end{frame}
\begin{frame}{Question 7(1)}
 \begin{align*}
     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
 \end{align*}
\end{frame}
\begin{frame}{Question 7(2)}
    \begin{align*}
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\begin{frame}{Question 7(2)}
    \begin{align*}
    (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{align*}
\end{frame}
\begin{frame}{Question 7(3)}
\begin{align*}
    \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{align*}
\end{frame}
\begin{frame}{Question 7(4)}
    \begin{align*}
        \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{align*}
    \end{frame}}
\setbeamertemplate{background}{\includegraphics[width=\paperwidth,height=\paperheight]{images.jpg}}
\begin{frame}

\end{frame}
\end{document}
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