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Presentation

Source Rich Text

```latex
\documentclass[10pt]{beamer}
\usepackage[utf8]{inputenc}
\usepackage{graphicx}
\usepackage{xcolor}
\definecolor{Amethyst}{rgb}{0.6,0.40,0.8}
\definecolor{Dark Lavender}{rgb}{0.45,0.39,0.59}
\definecolor{pastelpurple}{rgb}{0.59,0.44,0.84}
\usetheme{Berlin}
\usecolortheme[named=Amethyst]{structure}
\title{\textbf{ASSIGNMENT}}
\author{{\textbf{\textcolor{Dark Lavender}{Shweta Shukla}} \\ College Roll No.- MAT/20/9\\ University Roll No. - 20044563006}}
\date{}
\institute{{MATA SUNDRI COLLEGE FOR WOMEN\\
(UNIVERSITY OF DELHI)}}
\begin{document}
\begin{frame}{\textbf{{Presentation}}}
   \maketitle


\end{frame}

\begin{frame}{{Example 9.5}}

\begin{itemize}
    \item Let $\mathbf{x}=(x_1,\ldots,x_n)$,
    where the $x_i$ are non-negative real numbers.
    Set
    \[
    M_r (\mathbf{x})=\left(\frac{x_1^r+x_2^r+\cdots +x_n^r}{n}\right)^{1/r}
    \; \; r \in \mathbf{R} \setminus \{0\},
    \]
    and
    \[
    M_0 (\mathbf{x})=\left(x_1 x_2 \cdots x_n\right)^{1/n}.
    \]
    We call $M_r(\mathbf{x})$ the \emph{$r$th power mean} of $\mathbf{x}$.

    Claim:\\
   \[
   \lim_{r \rightarrow 0} M_r(\mathbf{x}) = M_0(\mathbf{x}).
   \]

\end{itemize}

\end{frame}
\begin{frame}{Continued Example 9.5}
    \begin{itemize}
        \item Define\\
   \[
   V_n=
   \left[
   \begin{array}{ccccc}
    1 & 1 & 1 & \ldots & 1\\
    x_1 & x_2 & x_3 & \ldots & x_n\\
    x_1^2 & x_2^2 & x_3^2 & \ldots & x_n^2\\
    \vdots & \vdots & \vdots & \ddots & \vdots\\
    x_1^{n-1} & x_2^{n-1} & x_3^{n-1} & \ldots & x_n^{n-1}
    \end{array}
    \right]
    \]
     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{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 \[ \sum_{k=1}^n=\frac{n(n+1)}{2}\]
    \item \[ \frac{\pi}{4}= \frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\ldots\]
    \item \[\cos{\theta}=\sin{(90-\theta)}\]
\end{itemize}

\end{frame}
\begin{frame}{Continued Question 4}

\begin{itemize}
    \item \[{\mathbf{e}}^{\mathbf{i}\theta}=\cos{\theta}+\mathbf{i}\sin{\theta}\]
    \item \[ \lim_{\theta \rightarrow 0} \frac{\sin{\theta}}{\theta}=1\]
    \item \[ \lim_{x\rightarrow \infty}\frac{\pi \left( x\right)}{x/\log{x}}=1\]
    \item \[ \int_{-\infty}^\infty {\mathbf{e}}^{-x^2} dx =\sqrt{\pi}\]
  \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 $c + a > b$.
    \item The area of a triangle with side lengths $a$, $b$, $c$ 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}$.
    \item The volume of a regular tetrahedron of edge length 1 is $\frac{\sqrt{2}}{12}$.
    \item The quadratic equation $ax2 + bx + c = 0$ has roots
    \[r_1,r_2=\frac{-b \pm \sqrt{b^2-4ac}}{2a}\]
  \end{itemize}

\end{frame}
\begin{frame}{Continued Question 5}

\begin{itemize}
    \item The \emph{derivative} of a function $f$, denoted $f'$ is defined by :
    \[ f'\left( x\right) =\lim_{ h\rightarrow 0} \frac{f\left( x+h\right) -f\left( x\right)}{h}\]
    \item A real-valued function $f$ is \emph{convex} on an interval $I$ if
    \[f\left( \lambda x+\left( 1-\lambda \right)y\right) \leq \lambda f\left( x\right) +\left( 1-\lambda \right)f\left( y\right) ,\]
    for all $x$, $y$ $\in$ \; $I$ \; and $0 \leq \lambda \leq 1$ .
    \item The general solution to the differential equation
    \[y''-3y'+2y=0\] is \[y=C_1{\mathbf{e}}^{x}+C_2{\mathbf{e}}^{2x} .\]

\end{itemize}

\end{frame}
\begin{frame}{Continued Question 5}

    \begin{itemize}
        \item The Fermat number $F_n$ is defined as
        \[F_n=2^{2^n} , \; n \geq 0\]

    \end{itemize}

\end{frame}
\begin{frame}{{Question 6}}

    \begin{itemize}
        \item \[\frac{d}{dx}\left( \frac{x}{x+1}\right) =\frac{1}{\left( x+1 \right) ^2}\]
        \item \[ \lim_{n \rightarrow \infty} \left( 1+\frac{1}{n} \right)^{n}=\mathbf{e}\]
        \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}{Continued Question 6}
    \begin{itemize}
        \item \[ \left| \begin{array}{ccc}
            \mathbf{\textbf{i}} & \mathbf{\textbf{j}} & \mathbf{\textbf{k}} \\
            a_1 & a_2 & a_3 \\
            b_1 & b_2 & b_3
        \end{array}\right| =
        \left| \begin{array}{cc}
            a_2 & a_3 \\
            b_2 & b_3
        \end{array} \right| {\mathbf{\textbf{i}}}
        -
        \left| \begin{array}{cc}
            a_1 & a_3 \\
            b_1 & b_3
        \end{array} \right| {\mathbf{\textbf{j}}}
        +
        \left| \begin{array}{cc}
            a_1 & a_2 \\
            b_1 & b_2
        \end{array} \right| {\mathbf{\textbf{k}}}\]
        \item \[ \left[ \begin{array}{cc}
            a_{11} & a_{12} \\
            a_{21} & a_{22}
        \end{array} \right]
        \left[ \begin{array}{cc}
            b_{11} & b_{12} \\
            b_{21} & b_{22}
        \end{array} \right]
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        =
        \left[ \begin{array}{cc}
            a_{11}b_{11}+a_{12}b_{21} & a_{11}b_{12}+a_{12}b_{22} \\
            a_{21}b_{11}+a_{22}b_{21} & a_{21}b_{12}+a_{22}b_{22}
        \end{array} \right]\]
        \item  \[f\left( x\right)=\begin{cases}
        -x^2 \, ,\, x<0\\
        \;x^2 \; ,\, 0 \leq x \leq 2 \\
        \;4\;\; \, ,\, x>2
        \end{cases}\]
\end{itemize}
\end{frame}

\begin{frame}{{Question 7 Part 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
    \end{eqnarray*}
\end{frame}
\begin{frame}{{Question 7 Part 2}}
    \begin{eqnarray*}
        (a+b)^2 &=& (a+b)(a+b)\\
        &=& (a+b)a+(a+b)b\\
        &=& a(a+b)+b(a+b)\\
        &=& aa+ab+ba+bb\\
        &=& aa+ab+ab+bb\\
        &=& a^2+2ab+b^2
    \end{eqnarray*}
\end{frame}
\begin{frame}{{Question 7 Part 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-\frac{\tan{\alpha}+\tan{\beta}}{1-\tan{\alpha+\beta}}\tan{\gamma}}\\
            &=& \frac{\tan{\alpha}+\tan{\beta}+\tan{\gamma}(1-\tan{\alpha}\tan{\beta})}{(1-\tan{\alpha}\tan{\beta})-\tan{\gamma}(\tan{\alpha}+\tan{\beta})}\\
            &=& \tiny {\frac{\tan{\alpha}+\tan{\beta}+\tan{\gamma}-\tan{\alpha}\tan{\beta}\tan{\gamma}}{1-\tan{\alpha}\tan{\beta}-\tan{\gamma}\tan{\alpha}-\tan{\gamma}\tan{\alpha}-\tan{\gamma}\tan{\beta}}}
        \end{eqnarray*}

\end{frame}
\begin{frame}{{Question 7 Part 4}}
    \begin{eqnarray*}
        \prod_{p}(1-\frac{1}{p^2}) &=& \prod_{p}(\frac{1}{1+\frac{1}{p^2}+\frac{1}{p^4}+\ldots})\\
        &=& (\prod_{p}(1+\frac{1}{p^2}+\frac{1}{p^4}+\ldots))^{-1}\\
        &=& (1+\frac{1}{2^2}+\frac{1}{2^4}+\ldots)^{-1}\\
        &=& \frac{6}{{\pi}^2}
    \end{eqnarray*}
\end{frame}

\begin{frame}{\textbf{END OF SLIDE}}
    \begin{center}
        \includegraphics[width=2.5in,height=2.5in]{tysm purple.jpg}
    \end{center}
\end{frame}
\end{document}
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