assignment -2

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\documentclass{beamer}
\usepackage[utf8]{inputenc}
\usepackage[framemethod=tikz]{mdframed}
\usepackage{graphicx}
\usetheme{JuanLesPins}
\usecolortheme{crane}


\title{Assignment-2}
\author{Swasti Bhardwaj}
\institute{Mata Sundri College For Women \\ Delhi University}
\date{14 October'2021}

\begin{document}

\begin{frame}
\frametitle{\centerline{Assignment-2}}
%\titlepage
\begin{block}{\centerline{Presentation}}
\end{block}
\underline{Name} - Swasti Bhardwaj\\
\underline{College} - Mata Sundri College for Women \\
\quad\qquad\quad Delhi University\\
\underline{Roll no.} - MAT/20/125\\
\underline{University Roll no.} - 20044563050
\end{frame}

\begin{frame}
\frametitle{\centerline{Content of page 69}}
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    \begin{block}{1.}
        Let $x = (x_1,\cdots ,x_n)$, where the $x_i$ are non-negative real numbers. Set\\
       \[ M_r(x)=\left(\frac{x_1^r+x_2^r+\cdots +x_n^r}{n}\right)^{1/r} ,\, r \in \mathbf{R} \ \backslash \, \{0\} \,, \] and
       \[ M_0(x)=(x_1 x_2 \cdots x_n)^{1/n} . \]
       We call $M_r(x)$ the $ rth \,power \,mean $ of x.\\
       Claim:\[ \lim_{r\rightarrow 0} M_r(x)=M_0(x).\]
       \end{block}
\end{frame}

\begin{frame}
\frametitle{\centerline{Content of page 69}}
\begin{block}{2.}
     Define
    \[ V_n=\left[\begin{array}{ccccc}
    1&1&1&\ldots&1\\
    x_1&x_2&x_3&\ldots&x_n\\
    x_^2&x_2^2&x_3^2&\ldots&x_n^2\\
    \vdots&\vdots&\vdots&\ddots&\vdots\\
    x_1^{n-1}&x_2^{n-1}&x_3^{n-1}&\ldots&x_n^{n-1}
    \end{array}\right]\]
    We call $V_n$ the $Vandermonde\, matrix$ of order n.\\
    Claim:
    \[ det V_n = \prod_{1\leq i<j\leq n} (x_j-x_i). \]
\end{block}
\end{frame}
\begin{frame}
\frametitle{\centerline{Question 4 [ Part-1 ]}}
 \begin{mdframed}
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 \[ 3^3+4^3+5^3=6^3\]
\end{mdframed}
\begin{mdframed}
 \[ \sqrt{100}=10\]
\end{mdframed}
 \begin{mdframed}
  \[ (a+b)^3=a^3+3a^2{b}+3ab^2+b^3\]
  \end{mdframed}
\begin{mdframed}
 $$ \sum_{k=1}^n k = \frac{n(n+1)}{2}$$
 \end{mdframed}
 \begin{mdframed}
  $$\frac{\pi}{4}=\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+\frac{1}{9}-\frac{1}{11}+\cdots $$
  \end{mdframed}
  \end{frame}


  \begin{frame}
  \frametitle{\centerline{Question 4 [ Part-2 ]}}
\begin{mdframed}
 \[ \cos\theta= \sin(90^0-\theta) \]
\end{mdframed}
\begin{mdframed}
 \[ e^{i\theta}=\cos\theta + i\sin\theta \]
\end{mdframed}
 \begin{mdframed}
  \[ \lim_{\theta \rightarrow 0} \frac{\sin\theta}{\theta}=1\]
  \end{mdframed}
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\begin{mdframed}
$$ \lim_{x \rightarrow \infty} \frac{\pi x}{x/log x}=1$$
\end{mdframed}
\begin{mdframed}
 $$ \int_{-\infty}^{\infty} e^{-x^2} dx=\sqrt{\pi} $$
 \end{mdframed}
 \end{frame}

 \begin{frame}
 \frametitle{\centerline{Question-5 [ Part-1 ]}}
     \begin{mdframed}
        Positive numbers $a,b,$ and $c$ are the side lengths of a triangle if and only if $a+b>c,b+c>a,$ and $c+a>b.$
     \end{mdframed}
     \begin{mdframed}
        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 $(a+b+c)/2.$
     \end{mdframed}
     \begin{mdframed}
        The volume of a regular tetrahedron of edge length 1 is $\sqrt{2}/12.$
     \end{mdframed}
 \end{frame}

 \begin{frame}
 \frametitle{\centerline{Question-5 [ Part-2 ]}}
     \begin{mdframed}
        The quadratic equation $ax^2+bx+c=0$ has roots
        \[r_1,r_2=\frac{-b\pm \sqrt{b^2-4ac}}{2a}.\]
```

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        \end{mdframed}
        \begin{mdframed}
            The derivative of a function $f$ , denoted $f',$ is defined by
            \[ f'(x)=\lim_{h\rightarrow 0} \frac{f(x+h)-f(x)}{h}.\]
        \end{mdframed}
        \begin{mdframed}
            A real-valued function $f$ is convex on an interval $I$ if
            \[f(\lambda x +(1-\lambda)y)\leq \lambda f(x)+(1-\lambda)f(y),\]
            for all $x,y\in I$ and $0\leq \lambda \leq 1.$
        \end{mdframed}
    \end{frame}

    \begin{frame}
    \frametitle{\centerline{Question-5 [ Part-3 ]}}
        \begin{mdframed}
            The general solution to the differential equation
            \[y''-3y'+2y=0\]
            is
            \[y=C_1 e^x+C_2 e^{2x}.\]
        \end{mdframed}
        \begin{mdframed}
            The Fermat number $F_n$ is defined as
            \[F_n=2^{2^n}, n\geq 0.\]
        \end{mdframed}
    \end{frame}

    \begin{frame}
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\frametitle{\centerline{Question 6 [ Part-1 ]}}
    \begin{mdframed}
      \[\frac{d}{dx}\left(\frac{x}{x+1}\right)=\frac{1}{(x+1)^2}\]
    \end{mdframed}
    \begin{mdframed}
     \[ \lim_{n\rightarrow \infty} \left(1+\frac{1}{n}\right)^n=e\]
    \end{mdframed}
    \begin{mdframed}
     \[\left|\begin{array}{cc}
     a&b\\c&d
     \end{array}\right|=ad-bc \]
    \end{mdframed}
    \begin{mdframed}
     \[R_\theta = \left[\begin{array}{cc}
     \cos\theta&-\sin\theta\\
     \sin\theta&\cos\theta
     \end{array}\right]\]
    \end{mdframed}
\end{frame}

\begin{frame}
\frametitle{\centerline{Question 6 [ Part-2 ]}}
    \begin{mdframed}
     \[ \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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    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} \]
  \end{mdframed}\bigskip
  \framebox(320,50)
   { \[\left[\begin{array}{cc}
    a_{11}&a_{12}\\
    a_{21}&a_{22}
    \end{array}\right]\left[\begin{array}{cc}
    b_{11}&b_{12}\\
    b_{21}&b_{22}
    \end{array}\right]=\left[\begin{array}{cc}
    a_{11}b_{11}+a_{12}b_{21}&a_{11}b_{12}+a_{12}b_{22}\\
    a_{21}b_{11}+a_{22}b_{21}&a_{21}b_{12}+a_{22}b_{22}
    \end{array}\right]\] }
    \begin{mdframed}
      \[f(x) = \left\{\begin{array}{lr}
      -x^2 ,&x<0\\
      x^2 ,&0\leq x\leq 2\\
      4 ,&x>2
      \end{array}\right.\]
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        \end{mdframed}
\end{frame}

\begin{frame}
\frametitle{\centerline{Question-7}}
\begin{block}{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+25+27+28+29+30&=&31+32+33+34+35
\end{eqnarray*}
\end{block}
\end{frame}

\begin{frame}
\frametitle{\centerline{Question-7}}
\begin{block}{Part-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}
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\begin{frame}
\frametitle{\centerline{Question-7}}
\begin{block}{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-\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}

\begin{frame}
\frametitle{\centerline{Question-7}}
\begin{block}{Part-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=11cm,height=8cm]{ty.jpg}
\end{frame}
\end{document}
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