

TeX code compiled with `\documentclass{beamer}` using the Amsterdam theme. There is one png image needed to compile slides:

arc_chord_limit.png

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\begin{document} \begin{frame} \large \begin{block}{} \begin{center} $\displaystyle \lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$ \hspace{15pt} $\displaystyle \lim_{x \rightarrow 0} \frac{\cos(x)-1}{x} = 0$ \end{center} \end{block} Evaluate the limits: \vspace{5pt} \begin{columns} \begin{column}{0.5\textwidth} $$\lim_{x \rightarrow 0} \frac{\sin(6x)}{\sin(9x)}$$ \vspace{15pt} $$\lim_{\theta \rightarrow 0} \frac{\cos(7\theta)-1}{\sin(9\theta)}$$ \vspace{15pt} $$\lim_{t \rightarrow 0} \frac{\tan(16t)}{\sin(4t)}$$ \end{column} \begin{column}{0.5\textwidth} $$\lim_{x \rightarrow 0} \frac{\sin(x^7)}{x}$$ \vspace{15pt} $$\lim_{x \rightarrow 2} \frac{\sin(x-2)}{x^2+6x-16}$$ \vspace{15pt} $$\lim_{x \rightarrow 2} \frac{3-3\tan(x)}{\sin(x)-\cos(x)}$$ \end{column} \end{columns} \end{frame} \begin{frame} \LARGE Use both the derivatives of $\sin(x)$ and $\cos(x)$ and the quotient rule to show: $$\frac{d}{dx}(\tan(x)) = \sec^2(x) \text{ and } \frac{d}{dx}(\sec(x)) = \sec(x)\tan(x)$$ \end{frame} \begin{frame} \LARGE \begin{columns} \begin{column}{0.5\textwidth} Find $f'(x)$: $$f(x) = 5x^2 + 7\sin(x)$$ \vspace{20pt} Find $g'(\theta)$: $$g(\theta) = \sec(\theta)\tan(\theta)$$ \end{column} \begin{column}{0.5\textwidth} Find $F'(x)$: $$F(x) = \frac{3-\sec(x)}{\tan(x)}$$ \vspace{20pt} Evaluate: $$\frac{d^2}{d\theta^2}(\theta \sin(\theta))$$ \end{column} \end{columns} \end{frame} \begin{frame} \LARGE Find the equation of the tangent line to the curve $y = 14x \sin(x)$ at $x = \pi/2$. \vspace{55pt} Find $$\frac{d^{103}}{dx^{103}}(\sin(x)) \text{ and } \frac{d^{201}}{dx^{201}}(\cos(x))$ \end{frame} \begin{frame} \emph{Step into your teacher's shoes. What is wrong (if anything) with the following calculations? Explain any errors and correct for them.} \vspace{5pt} \begin{block}{} Find all values of $x$ in the interval $[0, 4\pi]$ that satisfy the equation $\sin(2x) = \cos(x)$. Solution: Since $\sin(2x) = 2\sin(x)\cos(x)$, $\sin(2x) = \cos(x) \rightarrow 2\sin(x)\cancel{\cos(x)} = \cancel{\cos(x)} \rightarrow 2\sin(x) = 1 \rightarrow \sin(x) = \frac{1}{2}$. Therefore, $x = \frac{\pi}{6}$ or $x = \frac{5\pi}{6}$. \end{block} \end{frame} \begin{frame} What does $\displaystyle \lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$ mean? Explain why three of the options are false and one is true. \begin{itemize} \item[a)] $\frac{0}{0} = 1$. \item[b)] The tangent to the graph of $y = \sin(x)$ at $(0,0)$ is the line $y=x$. \item[c)] You can cancel the $x$'s. \item[d)] $\sin(x) = x$ for $x$ near 0. \end{itemize} \end{frame} \begin{frame} The figure shows a circular arc of length $s$ and a chord of length $d$, both subtended by a central angle $\theta$. Find $\displaystyle \lim_{\theta \rightarrow 0^+} \frac{s}{d}$. \begin{center} \includegraphics[height=2in]{arc_chord_limit.png} \end{center} It may be helpful to review the formulas associated to arcs and isosceles triangles. Further, why would the limit $\displaystyle \lim_{\theta \rightarrow 0} \frac{s}{d}$ not exist? \end{frame} \end{document}
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From:

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Permanent link:

http://www2.math.binghamton.edu/p/calculus/resources/calculus_flipped_resources/derivatives/2.4_trig_derivatives_tex 

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