

TeX code compiled with \documentclass{beamer} using the Amsterdam theme.

```
\begin{document} \begin{frame} Find the linearization of each function: \vskip 5pt \begin{itemize} \item[\bf a)] $h(x) = x^4 - 3x^2 - 1$ at $a=-1$. \vskip 20pt \item[\bf b)] $f(x) = \sin^2(x)$ at $a=\frac{\pi}{2}$. \vskip 20pt \item[\bf c)] $g(x) = \frac{1}{(1+3x)^4}$ at $a=0$. \vskip 20pt \item[\bf d)] $r(t) = t^{\frac{3}{4}}$ at $a=16$. \end{itemize} \end{frame} \begin{frame} \large Use a linear approximation to estimate the value of $\sqrt[3]{9}$. \vskip 30pt Use a linear approximation to estimate the value of $\tan(44^\circ)$. \end{frame} \begin{frame} \large The line tangent to the graph of $f(x) = \sin(x)$ at the point $(0,0)$ is $y=x$. This implies that \vskip 10pt \begin{enumerate}[a)] \item $\sin(0.0005) \approx 0.0005$ \vskip 10pt \item The line $y=x$ touches the graph of $f(x) = \sin(x)$ at exactly one point, $(0,0)$. \vskip 10pt \item $y=x$ is the best straight line approximation to the graph of $f$ for all $x$. \end{enumerate} \end{frame} \begin{frame} \large Peeling an orange changes its volume $V$. What does $\Delta V$ represent? \vskip 10pt \begin{enumerate}[a)] \item the volume of the rind. \vskip 10pt \item the surface area of the orange. \vskip 10pt \item the volume of the "edible part" of the orange. \vskip 10pt \item $-1 \times (\text{the volume of the rind})$. \end{enumerate} \end{frame} \begin{frame} \large Imagine that you increase the dimensions of a square with side $x_1$ to a square with side length $x_2$. The change in the area of the square, $\Delta A$, is approximated by the differential $dA$. Find $dA$: \vskip 10pt \begin{enumerate}[a)] \item $2x_1(x_2 - x_1)$ \vskip 10pt \item $2x_2(x_2 - x_1)$ \vskip 10pt \item $x_1^2 - x_2^2$ \vskip 10pt \item $(x_2 - x_1)^2$ \end{enumerate} \end{frame} \begin{frame} \large Imagine that you increase the dimensions of a square with side $x_1$ to a square with side length $x_2$. The change in the area of the square, $\Delta A$, is approximated by the differential $dA = 2x_1(x_2 - x_1)$. This approximation will result in an \vskip 5pt \begin{enumerate}[a)] \item overestimate \vskip 10pt \item underestimate \vskip 10pt \item exactly equal \end{enumerate} \end{frame} \begin{frame} \large Find the differential of each function: \begin{columns} \begin{column}{0.5\textwidth} \begin{itemize} \item[\bf a)] $y = \sqrt{1+x^2}$ \vskip 20pt \item[\bf b)] $y = x^2 \sin(x)$ \end{itemize} \end{column} \begin{column}{0.5\textwidth} \begin{itemize} \item[\bf c)] $y = \sec(\left(\sqrt{7x}\right))$ \vskip 20pt \item[\bf d)] $y = \frac{3-t^2}{3+t^2}$ \end{itemize} \end{column} \end{columns} \end{frame} \begin{frame} \large The radius of a sphere is measured to be $84$ inches with a possible error of $0.5$ inches. \begin{itemize} \item[\bf a)] Use differentials to estimate the maximum error in the calculated surface area. What is the relative error? \vskip 20pt \item[\bf b)] Use differentials to estimate the maximum error in the calculated volume. What is the relative error? \vskip 20pt \item[\bf c)] Use differentials to estimate the amount of paint needed to apply a coat of paint $0.1$ cm thick to hemispherical dome with diameter $50$ meters. \vskip 15pt \item[\bf d)] A window has the shape of a square surmounted by a semicircle. The base of the window is measured as having width $50$ inches with a possible error in measurement of $0.1$ inches. \vskip 15pt Use differentials to estimate the maximum error possible in computing the area of the window. What is the maximum relative error? \end{itemize} \end{frame} \end{document}
```

From:  
<http://www2.math.binghamton.edu/> - Binghamton University Department of Mathematics and Statistics

Permanent link:  
[http://www2.math.binghamton.edu/p/calculus/resources/calculus\\_flipped\\_resources/calculus/calculus\\_flipped\\_resources/calculus\\_flipped\\_resources/applications/2.9\\_linearization\\_differentials\\_tex.html](http://www2.math.binghamton.edu/p/calculus/resources/calculus_flipped_resources/calculus/calculus_flipped_resources/calculus_flipped_resources/applications/2.9_linearization_differentials_tex.html)

Last update: 2015/08/29 03:12

