

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

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\begin{document} \begin{frame} \large Let  $f(x)$  be a differentiable function on a closed interval with  $x=a$ 
being one of the endpoints of the interval. If  $f'(x)>0$  for all  $x$ , then \vskip 15pt \begin{itemize} \item[\bf (a)]  $f$ 
could have either an absolute maximum or minimum at  $x=a$ . \vskip 15pt \item[\bf (b)]  $f$  cannot have an
absolute maximum at  $x=a$ . \vskip 15pt \item[\bf (c)]  $f$  must have an absolute minimum at  $x=a$ . \vskip 15pt
\item[\bf (d)]  $x=a$  must be a critical number for  $f$ . \end{itemize} \end{frame} \begin{frame} \large If  $f$  is
continuous on  $[a,b]$ , then \vskip 15pt \begin{itemize} \item[\bf (a)] there must be local extreme values, but there
may or may not be an absolute maximum or minimum value for the function. \vskip 15pt \item[\bf (b)] there must
be numbers  $m$  and  $M$  such that  $m\leq f(x)\leq M$ , for all  $x$  in  $[a,b]$ . \vskip 15pt \item[\bf (c)] any absolute
maximum or minimum would be at either the endpoints of the interval, or at places in the domain where  $f'(x)=0$ .
\end{itemize} \end{frame} \begin{frame} \large Find the absolute extrema of: \vskip 15pt \begin{itemize}
\item[\bf (a)]  $f(x)=x^3-3x+1$  on the interval  $[0,3]$ . \vskip 15pt \item[\bf (b)]  $g(x)=\frac{x^2-4}{x^2+4}$  on
the interval  $[-4,4]$ . \vskip 15pt \item[\bf (c)]  $h(t)=t\sqrt{4-t^2}$  on the interval  $[-1,2]$ . \vskip 15pt \item[\bf
(d)]  $i(x)=x+\cot\left(\frac{x}{2}\right)$  on the interval  $\left(\frac{\pi}{4},\frac{7\pi}{4}\right)$ . \end{itemize}
\end{frame} \begin{frame} \large Find the highest and lowest points on the graph of  $f(x) = x^3-3x+6$  on the
following intervals: \vskip 15pt \begin{itemize} \item[\bf (i)]  $[-2,2]$ . \vskip 15pt \item[\bf (ii)]  $[-2,3]$ . \vskip
15pt \item[\bf (iii)]  $(-2,3)$ . \end{itemize} \end{frame} \begin{frame} \large Show that the maximum and
minimum values of the function  $f(x) = x^3+ax^2+bx+c$  on the interval  $[p,q]$  occur at the endpoints if
 $a^2 < 3b$ . \vskip 50pt If  $a$  and  $b$  are positive numbers, find the maximum value of  $f(x)=x^a(1-x)^b$ 
on the interval  $[0,1]$ . \end{frame} \end{document}

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From:

<https://www2.math.binghamton.edu/> - **Department of Mathematics and Statistics, Binghamton University**

Permanent link:

https://www2.math.binghamton.edu/p/calculus/resources/calculus_flipped_resources/applications/closed_interval_method_tex

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