Extreme value

Determine the maximum and minimum velocity of the function given

2) $v(t)=t^3-3t^2+4$ $[0, 4]$

$v'(t)=a(t)=3t^2-6t$

$0=3t^2-6t$

$0=3t(t-2)$

$t=0 \quad t=2$

$v(0)=4$

$v(2)=8-12+4=0$

$v(4)=64-48+4=20$

$(2,0)$ Abs Min

$(4,20)$ Abs Max

Determine the maximum and minimum acceleration of the function given

5) $v(t)=4t^2-6t^3$ $[0, 3]$

$a(t)=v'(t)=8t-18t^2$

$a'(t)=8-36t$

$0=8-36t$

$\frac{36t}{36}=\frac{8}{36}$

$t=\frac{2}{9}$

$a(0)=0$

$a\left(\frac{2}{9}\right)=8\left(\frac{2}{9}\right)-18\left(\frac{2}{9}\right)^2$

$=\frac{16}{9}-\frac{18}{1}\left(\frac{4}{81}\right)$

$=\frac{16}{9}-\frac{2}{9}\left(\frac{4}{9}\right)$

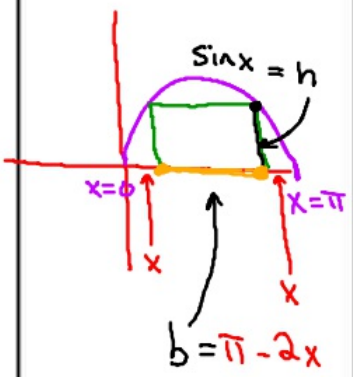
$=\frac{16}{9}-\frac{8}{9}=\frac{8}{9}$

$a(3)=-138$

Maximize
Minimize

What you'll Learn About:
How to use derivatives to solve real world problems

$y = \sin x \rightarrow$ height



A) A rectangle is ~~to be~~ inscribed under one arch of the sine curve. What is the largest area the rectangle can have, and what dimensions give that area.

Take derivative of

$A = lw$ $A = bh$

$A = (\pi - 2x)\sin x$

$A'(x) = (\pi - 2x)\cos x + \sin x(-2)$

$0 = (\pi - 2x)\cos x - 2\sin x$

$x = .710, 2.431$ and $A'(.710) = 0$

Local Max b/c A' changes from + to −

$A'(.5) = .920 > 0$

$A'(1) = -1.066 < 0$

$A'(2.5) = .290 > 0$

$b = \pi - 2x$

$b = \pi - 2(.710)$

$h = \sin(.710)$

$A = (\pi - 2(.710))(\sin(.710))$

B) A rectangle is to be inscribed between the curve $y = 25 - x^2$ and the x-axis. What is the largest area the rectangle can have, and what dimensions give that area.