r^3

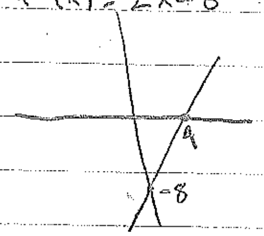
s cm^3

FUNCTION ANALYSIS

$f(x)=x^2-8x+9$

$f'(x)=2x-8 \qquad 2x-8=0$

$x=4$



$f(x)=1+12x-3x^2-2x^3$

$f'(x)=12-6x-6x^2$ Derivative is a parabola

$\dfrac{12-6x-6x^2=0}{6}$

$x^2+x-2=0$

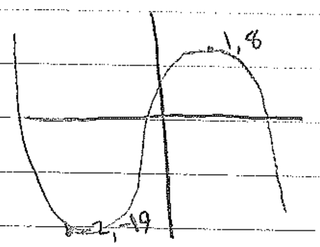
$x=-2,1$ make derivative 0 $\qquad (x+2)(x-1)=0$

$1+12(1)-3(1)^2-2(1)^3$

$8 \qquad 1+12(-2)-3(-2)^2-2(-2)^3$

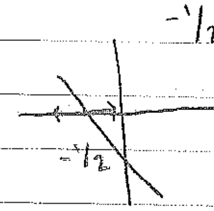
$1-24-12+16$

19



$f''(x)=-6-12x=0$ Finds concavity

$-1/2$



$f(x)=3\sqrt[3]{x}-2$

$f'(x)=x^{-2/3} \qquad x^{-2/3}=0$ Not possible, Never equal to zero

$f(x)=\dfrac{x^2}{x^2-4}$

$f'(x)=\dfrac{(x^2-4)\cdot 2x-x^2(2x)}{(x^2-4)^2} \qquad \cancel{2x^3}-8x-\cancel{2x^3} \qquad -8x=0 \quad x=0$

$f(0)=0$

$\sin^2 x$

x	$f(x)$
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	1
2π	0

$f(x) = \sin^2 x$

$f'(x) = 2(\sin x)(\cos x)$ $\quad 2\sin x\cos x = 0$

$\sin x = 0$ $\quad \cos x = 0$

$x = 0, \pi, 2\pi$ $\quad x = \frac{\pi}{2}, \frac{3\pi}{2}$

$\sin^2 x + \sin x$

x	$f(x)$
0	0
$\pi/2$	2
$\frac{7\pi}{6}$	$-1/4$
$\frac{3\pi}{2}$	0
$\frac{11\pi}{6}$	$-1/4$
2π	0

$f(x) = \sin^2 x + \sin x \; [0, 2\pi]$

$f'(x) = 2\sin x\cos x + \cos x = 0$

$\cos x(2\sin x + 1) = 0$

$\cos x = 0$ $\quad 2\sin x + 1 = 0$

$\frac{\pi}{2}$ & $\frac{3\pi}{2}$ $\quad \sin x = -1/2$

$\frac{7\pi}{6}$ & $\frac{11\pi}{6}$