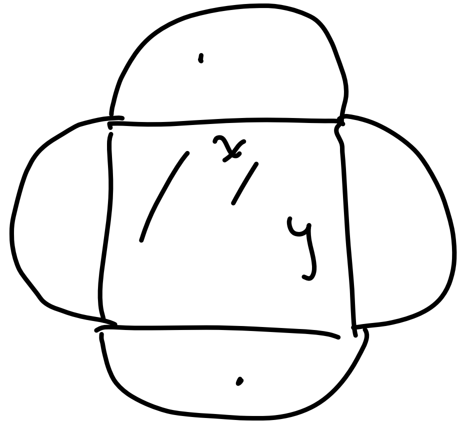
12/2 WINTER 2016

4 2 3 6




$$\text{Area} = xy + \pi\left(\frac{x}{2}\right)^2 + \pi\left(\frac{y}{2}\right)^2$$

(4,6) on curve $y(x)$

find $y(3.8)$ approximately

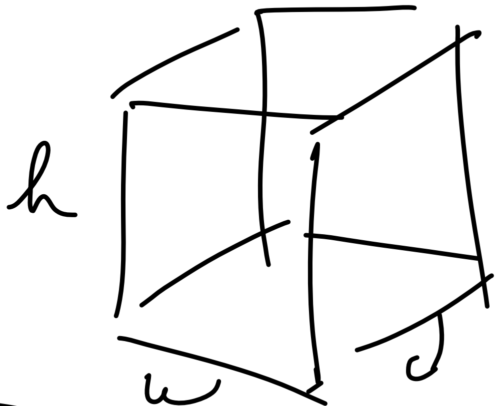
$$0 = y + xy' + \frac{\pi}{4}2x + \frac{\pi}{4}2yy'$$

at $x=4$, $y=6$ $\quad 0 = 6 + 4y' + 2\pi + 3\pi y'$

$$\frac{-(6+2\pi)}{4+3\pi} = y' \text{ at } x=4$$

$$L(x) = -\frac{(6+2\pi)}{4+3\pi}[x-4] + 6$$

$$y(3.8) \approx L(3.8) = \frac{6+2\pi}{4+3\pi}(.2) + 6$$




$$4h\cdot 2 + 8w\cdot 1 \le 40$$

Max Vol.

$$8h + 8w = 40$$

$$h + w = 5$$

$$V = w^2 h$$

$$V = w^2(5-w)$$

$$\frac{dV}{dw} = 10w - 3w^2 = 0$$

$$w = 0 \qquad w = 10/3$$

$$h = 5 - w \ge 0$$

$$w \ge 0 \qquad 0 \le w \le 5$$

$$V(0) = 0 \qquad V(5) = 0 \qquad V\left(\tfrac{10}{3}\right) = \left(\tfrac{10}{3}\right)^2\left(5 - 10/3\right)$$

MAX Vol.

BY EXT. VALUE THEOREM V HAS A ABS. MAX on $[0,5]$ WHICH OCCURS EITHER at AN ENDPOINT OR A CRITICAL POINT

V = 0 AT ENDPOINTS ONLY ONE OTHER C.P. $w = 10/3$

$V(\tfrac{10}{3}) > 0$ SO IT IS THE MAX VALUE

$$\boxed{w = 10/3 \qquad h = 5 - \tfrac{10}{3}}$$

(a) $-2, 0, 5, 7$

(b) $-2, 7$

$f(1) = 4/3 \qquad f'(1) = 3$

$L(x) = 3(x-1) + 4/3$

$f(1.1) \approx L(1.1) = 3(.1) + 4/3$

$G(x) = \sin(\pi f(x))$

$G'(x) = [\cos(\pi f(x))] \pi f'(x)$

$G'(1) = \cos(\pi f(1)) \cdot \pi f'(1)$

$= \cos(\pi \cdot 4/3) \cdot \pi \cdot 3 = -\frac{3\pi}{2}$

need $\frac{dy}{dx}$ when $t=-1$ $x=0, y=0$

$x = \cos(\pi t) + t^2$

$y = 2(t-1)\sin((t+1)\pi)$

$$\frac{dy}{dx} = \frac{dy/dt}{dx/dt}$$

$\frac{dx}{dt} = -\pi \sin(\pi t) + 2t$

at $t=-1$ $= -\pi \sin(-\pi) - 2$

$= -2$

$\frac{dy}{dt} = 2\sin((t+1)\pi)$

$+ 2(t-1)\cos((t+1)\pi)\pi$

at $t=-1$: $\frac{dy}{dt} = 2(-2)\cdot\pi = -4\pi$

at $t=-1$

$= \frac{-4\pi}{-2} = 2\pi$

$L(x) = 2\pi(x-0) + 0$

$= 2\pi x$

eq of line

$y = 2\pi x$