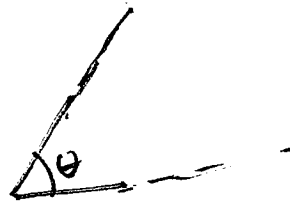
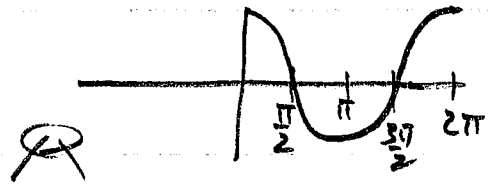


4.4



15] $A = \frac{1}{2} ab \sin \theta$
 $A' = \frac{1}{2} ab \cos \theta = 0$
 $\theta = \frac{\pi}{2}$



27] $r(x) = x[200 - 2(x-50)]$ $p = r - c$

$c(x) = 6000 + 32x$

$p(x) = 200x - 2x^2 + 100x - 6000 - 32x$
 $= -2x^2 + 268x - 6000$

$p'(x) = -4x + 268 = 0$

$268 = 4x$

$67 = x$

11]



primary: $SA = 4xh + x^2$ secondary: $V = x^2h = 500$
 $= 4x\left(\frac{500}{x^2}\right) + x^2$ $h = \frac{500}{x^2}$
 $= 2000x^{-1} + x^2$

$SA' = -2000x^{-2} + 2x = 0$

$2x = \frac{2000}{x^2}$ $x \neq 0$

$2x^3 = 2000$

$x^3 = 1000$

$x = 10$

$\frac{511x}{x^2}$

$\frac{x^2 + 4x - 7}{x^3 + 1}$

4.4

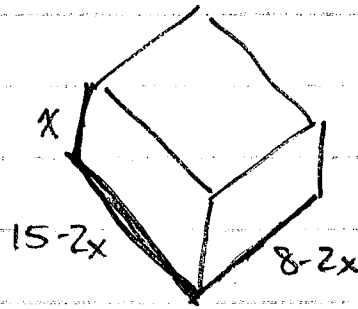
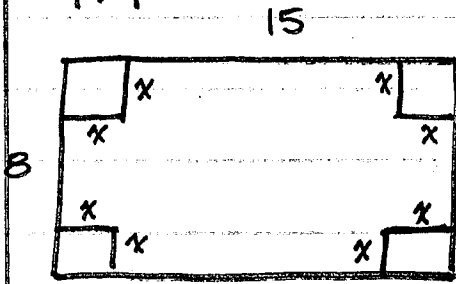
17] primary $A = 8r^2 + 2\pi rh$ secondary: $V = \pi r^2 h = 1000$
 $= 8r^2 + 2\pi r \left(\frac{1000}{\pi r^2}\right)$ $h = \frac{1000}{\pi r^2}$
 $= 8r^2 + 2000r^{-1}$ $h = \frac{1000}{\pi (5)^2}$
 $A' = 16r - 2000r^{-2} = 0$ $= \frac{40}{\pi}$
 $16r = 2000r^{-2}$ $h = \frac{40}{\pi}$
 $r^3 = \frac{2000}{16}$ $h = \frac{10}{\pi}$
 $r^3 = 125$
 $r = 5$

23] $p(x) = \dot{f}(x) = c(x)$ $\frac{4}{\sqrt{x}} = 4x$ $x \neq 0$
 $= 8x^{1/2} - 2x^2$
 $p'(x) = 4x^{-1/2} - 4x = 0$ $\frac{4}{4} = 4x^{3/2}$
 $4x^{-1/2} = 4x$ $\frac{4}{4} = \frac{4x^{3/2}}{4}$
 $x^{-1/2} = x$ $\frac{x^{-1/2}}{x^{-1/2}} = \frac{x}{x^{-1/2}}$ $0(-7) = (-\pi) \cdot 0$
 $1 = x^{3/2}$ $\frac{x^{-1/2}}{x^{-1/2}} = \frac{x}{x^{-1/2}}$ $0 = 0$
 $1 = x$

33] (a) $f(x) = x^2 + ax^{-1}$ (b) $f''(x) = 2 + 2ax^{-3}$
 $f'(x) = 2x - ax^{-2}$ $f''(1) = 2 + 2a(1)^{-3} = 0$
 $f'(2) = 2(2) - a(2)^{-2} = 0$ $2a(1)^{-3} = -2$
 $4 - \frac{a}{4} = 0$ $a = \frac{-2}{2} = -1$
 $4 = \frac{a}{4}$
 $16 = a$

4.4

7



primary: $V = x(15-2x)(8-2x)$
 $= (15x-2x^2)(8-2x)$
 $= 120x - 30x^2 - 16x^2 + 4x^3$
 $= 120x - 46x^2 + 4x^3$
 $V' = 120 - 92x + 12x^2 = 0$

$\left(\frac{5}{3}, \frac{2}{3}\right)$
 $\frac{5}{3} \times \left(\frac{2}{3} \times 4\right)$

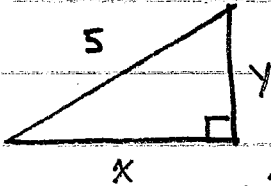
INCR	DECR
$f'(x) > 0$	$f'(x) < 0$

$\frac{5}{3}$

$\sqrt{25-16} = \sqrt{9} = 3$

$5-4 = 1$

2



$x > 0 \quad x < 5$

primary: $A = \frac{1}{2}xy$ secondary: $x^2 + y^2 = 5^2$

$A = \frac{1}{2}x\sqrt{25-x^2}$

$y^2 = 25-x^2$

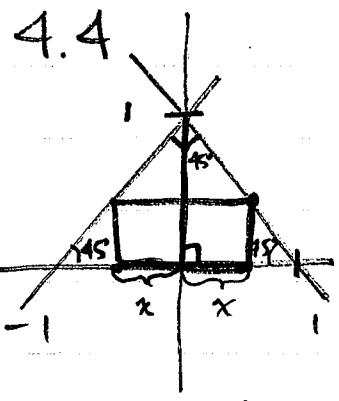
$A' = \frac{1}{2}\sqrt{25-x^2} + \frac{1}{2}(25-x^2)^{-\frac{1}{2}}$

$y = \sqrt{25-x^2}$

$= \frac{1}{2}\sqrt{25-x^2} + \frac{1}{2}(25-x^2)^{-\frac{1}{2}}[-x^2]$

$3.536 \times 3.536 \times 5$

5



INCR	DECR
$f'(x) > 0$	$f'(x) < 0$
$\frac{1}{4}$	$\frac{3}{4}$
$\frac{1}{2}$	

(a) $y = -x + 1$ secondary

(b) $A = 2xy$ primary

$A = 2x(-x+1)$

$A = -2x^2 + 2x$

$A' = -4x + 2 = 0$

$2 = 4x$

$\frac{1}{2} = x$

$A = 2(\frac{1}{2})(\frac{1}{2})$

$\frac{1}{2}$

$1 \times \frac{1}{2}$

$= (\frac{1}{2})$

12

$C = 5(x^2 + 4xy) + 10xy$ (primary)

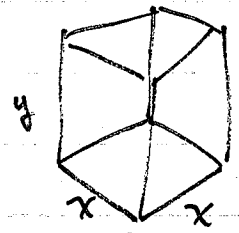
$= 5x^2 + 20xy + 10xy$

$= 5x^2 + 30xy$

$= 5x^2 + 30x(\frac{1125}{x^2})$

$= 5x^2 + \frac{33750}{x}$

$C' = 10x - \frac{33750}{x^2} = 0$



secondary $V = x^2 y = 1125$

$y = \frac{1125}{x^2}$

$x \neq 0$

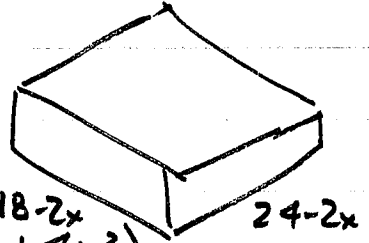
$x = 15 \quad y = 5$

$15 \times 15 \times 5$

4.4

19 primary: $V = 2x(18-2x)(24-2x)2x$

DOMAIN $[0,9]$



$$V = 2x(432 - 36x - 48x + 4x^2)$$

$$= 2x(432 - 84x + 4x^2)$$

$$= 864x - 168x^2 + 8x^3$$

$$V' = 864 - 336x + 24x^2 = 0$$

2,5

INCR.	DECR.
$f'(x) > 0$	$f'(x) < 0$
2	4

3.394

