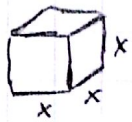
Review Ch. 4 Quiz
P.270 #49, 50, 63 P.184 #112, 117

P184 #112.

$\frac{dV}{dt} = 1200 \text{ cm}^3/\text{min}$ $x = 20$ cm



$V = x^3$

$\frac{dV}{dt} = 3x^2 \frac{dx}{dt}$

$1200 = 3(20)^2 \frac{dx}{dt}$

$1200 = 1200 \frac{dx}{dt}$

$1 \text{ cm/min} = \frac{dx}{dt}$

117. $V = \frac{1}{3}\pi r^2 h$

$\frac{dV}{dt} = -5 \text{ ft}^3/\text{min}$

a. $\frac{r}{h} = \frac{4}{10}$

$r = \frac{2}{5}h$

b. Find $\frac{dh}{dt}$ when $h = 6$

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi \left(\frac{2}{5}h\right)^2 h$

$V = \frac{1}{3}\pi \cdot \frac{4}{25}h^2 \cdot h$

$V = \frac{4}{75}\pi h^3$

$\frac{dV}{dt} = \frac{4}{25}\pi h^2 \frac{dh}{dt}$

$-5 = \frac{4}{25}\pi(6^2)\frac{dh}{dt}$

$-5 = \frac{144}{25}\pi \frac{dh}{dt}$

$-\frac{125}{144\pi} \text{ ft/min} = \frac{dh}{dt}$

P270. #49.

a. $t=0$ $t=6$ $t=12$

b. $t=3$ $t=9$

c. $6 < t < 12$

d. $0 < t < 6$ $12 < t < 14$

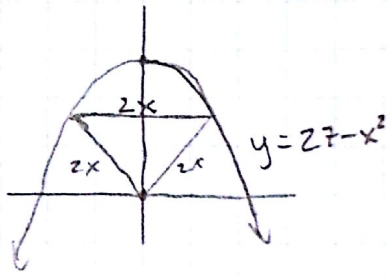
50. a. $t=4$

b. always decreasing, never zero

c. $0 < t < 4$

d. $4 < t < 8$

63.



$A = \frac{1}{2}bh$

$A = \frac{1}{2}(2x)(27 - x^2)$

$A = 27x - x^3$

$A' = 27 - 3x^2$

$= 3(9 - x^2) = 3(3-x)(3+x)$

$x = 3$ $x = -3$

$- \; 0 \; + \; + \; 0 \; + \; -$

-3 3

$\ominus$ $\oplus$ $\ominus$

$A'' = -6x$

$A''(-3) = -6(-3) = 18$ con up = min
not in domain.

$A''(3) = -6(3) = -18$ con down = max @ $x=3$

$A(3) = 27(3) - 3^3$

$A(3) = 81 - 27$

$A(3) = 54 \text{ un}^2$