Problem 7

a) a=8, b=2, c=2

$c < \log_b a$

$2 < \log_2 8$

$2 < 3$

Hence, case 3 of master theorem, $T(n) = O(n^3)$

b) a = 3, b=4, f(n) = nlogn

$\log_b a = \log_4 3 = 0.7925$

$f(n) = n\log n > n^{0.7925}$

Hence, case 1 of master theorem, T(n) = O(nlogn)

c) a = 2, b= 4, c = 0.5

$c = \log_b a$

$0.5 = \log_4 2$

0.5 = 0.5

Hence, case 2 of master theorem, $T(n) = O(\sqrt{n}\ \log n)$