6i. $T(n) = T(n/2) + \log(n)$

$a=1 \quad b=2 \quad c=1$

$\log_2 1 = 0 < 1 \rightarrow c$ is greater than $\log_b a$

regularity: $a f(n/b) \leq c f(n)$ for some constan $0 < c < 1$ and large n

Follows from 3rd case of Master Theorem;

$\$ = \Theta f(n) = \log(n)$

6ii. $T(n) = 8\,T\left(\frac{n}{2}\right) + 4n^2$

$a=8 \quad b=2 \quad c=2 \quad \log_2 8 = 3 \rightarrow 3 > 2$

follows from 1st case of Master Theorem;

$T(n) \in \Theta(n^{\log_b a}) = \$ = n^3$

6iii. $T(n) = n^2 + \frac{7}{4} T\left(\frac{n}{2}\right) + T\left(\frac{3}{4n}\right)$

$T(n) = n^2 + \frac{7}{4} T\left(\frac{n}{2}\right)$ as n gets large, this term converges to zero

~~$T(n) = n^2 + T\left(\frac{3}{4n}\right)$~~

$a = 7/4 \quad b=2 \quad c=2$

$\log_2 (7/4) = .807355$ which is less than c

$f(n/b) \leq c f(n)$ for some constant c

Follows from 3rd case of master theorem:

$\$ = \Theta f(n) = n^2$