(1) $T(n) = 8T(n/2) + 1000n^2$

WKT $T(n) = aT(n/b) + f(n)$

$a = 8$; $b = 2$, $f(n) = cn^d$

$= 1000 n^2$

$c = 1000$, $d = 2$

Since $a > b^d$

ie $8 > 2^2$

using master theorem

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

$= \Theta(n^{\log_2 8})$

$= \Theta(n^{\log_2 2^3}) = \Theta(n^3)$

(2) $T(n) = 2T(n/2) + n^2$

$a = 2$, $b = 2$, $c = 1$; $d = 2$

Since $a < b^d$

$2 < 2^2$

$T(n) = \Theta(n^d)$

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

(3) $T(n) = 2T(n/2) + 10n$

$a = 2$, $b = 2$, $c = 10$, $d = 1$

Since

$a = b^d$

$2 = 2^1$

using master theorm

$\therefore T(n) = \Theta(n^d \log n)$

$T(n) = \Theta(n \lg n)$