Apply Master's Theorem for the following recurrence relation.

1. $T(n) = 8T\left(\frac{n}{2}\right) + 1000n^2$

   According to Master's theorem,

   if, $f(n) = c * n^k$ where d ≥ 0 in recurrance and

   $T(n) = aT\left(\frac{n}{b}\right) + f(n)$ then,

   $T(n) \in \theta(n^k)$ if a < b^k

   $T(n) \in \theta(n^k logn)$ if a = b^k

   $T(n) \in \theta(n^{log_b a})$ if a > b^k

   Here a = 8, b = 2, k = 2 and since a > b^k

   $T(n) \in \theta(n^{log_2 8})$ $\approx$ $T(n) \in \theta(n^3)$

2. $T(n) = 2T\left(\frac{n}{2}\right) + n^2$

   According to Master's theorem,

   if, $f(n) = c * n^k$ where d ≥ 0 in recurrance and

   $T(n) = aT\left(\frac{n}{b}\right) + f(n)$ then,

   $T(n) \in \theta(n^k)$ if a < b^k

   $T(n) \in \theta(n^k logn)$ if a = b^k

   $T(n) \in \theta(n^{log_b a})$ if a > b^k

   Here a = 2, b = 2, k = 2 and since a < b^k

   $T(n) \in \theta(n^2)$

3. $T(n) = 2T\left(\frac{n}{2}\right) + 10n$

   According to Master's theorem,

   if, $f(n) = c * n^k$ where d ≥ 0 in recurrance and

   $T(n) = aT\left(\frac{n}{b}\right) + f(n)$ then,

   $T(n) \in \theta(n^k)$ if a < b^k

   $T(n) \in \theta(n^k logn)$ if a = b^k

   $T(n) \in \theta(n^{log_b a})$ if a > b^k

   Here a =2 , b = 2, k = 1 and since a = b^k

   $T(n) \in \theta(nlogn)$