Q3. A: $T(n) = 3T(\frac{n}{2}) + n^2$

$a=3, b=2, \log_b a = \log_2 3 \approx 1.58$

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

$af(\frac{n}{b}) = 3 \cdot (\frac{n}{2})^2 = \frac{3}{4}n^2 \leq k \cdot f(n)$ for one $k<1$

So, $T(n) = \Theta(n^2) = O(n^2)$

B: $T(n) = 4T(\frac{n}{4}) + n$

$a=4, b=4, \log_b a = 1$

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

C: $T(n) = 2(\frac{n}{2})^2 + n$

$= O(n^2)$

So, $B < A = C$.