$$T(n) = 2T(n/4) + n$$

$$a = 2$$

$$b = 4$$

$$f(n) = n$$

$$\log_a b = \log_2 4 = 2$$

Compare n to $n^{\log_2 4}$

n is slower than n^2

Case 1: Therefore,

If $f(n) = O\left(n^{\log_b a - \varepsilon}\right)$, for some $\varepsilon > 0$

then, $T(n) = \Theta\left(n^{\log_b a}\right)$

$$= \Theta\left(n^2\right)$$

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

$a = 2$

$b = 4$

$f(n) = n^2$

$\log_b a = \log_4 2 = 0.5$

compare n to $n^{\frac{1}{2}}$

n grows faster than $n^{\frac{1}{2}}$

therefore

Case 3: If $f(n) = \Omega\left(n^{\log_b a + \varepsilon}\right)$ for some constant $\varepsilon > 0$

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

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