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(Q2).

(a) $T(n) = \sqrt{2}\, T(n/2) + \log n$

$a = \sqrt{2} \quad b = 8 \quad k = 1 \quad p = 1$

$b^k = 2^1 = 2$

$a < b^k$ & $p \geq 0$

$T(n) = \theta(n^k \log^p n)$

$= \theta(n^1 \log^1 n)$

$= \theta(n \log n)$

(b) $T(n) = 7\, T(n/3) + n^2$

$a = 7 \quad b = 3 \quad k = 2 \quad p = 0$

$b^k = 3^2 = 9$

$a < b^k$ & $p \geq 0$

$\theta(n^k \log^p n)$

$\theta(n^2 \log^0 n)$

$\theta(n^2)$

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(c) $T(n) = 3T(n/4) + n\log n$

$a = 3 \quad b = 4 \quad k = 1 \quad P = 1$

$b^k = 4^1 = 4$

$a < b^k \qquad P \geq 0$

$T(n) = \theta(n^k \log^P n)$

$= \theta(n^1 \log^1 n)$

$= \theta(n \log n)$