

Master's Theorem

1. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 25T(n/5) + n^2$
 - ☐ A) By case 1: $T(n) = \Theta(n^2)$
 - ☐ B) By case 2: $T(n) = \Theta(n^2 \log n)$
 - ☐ C) By case 3: $T(n) = \Theta(n^2)$
 - ☐ D) Master Theorem does not apply
2. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 64T(n/4) + n^2$
 - ☐ A) By case 3: $T(n) = \Theta(n^2)$
 - ☐ B) By case 2: $T(n) = \Theta(n^3 \log n)$
 - ☐ C) By case 1: $T(n) = \Theta(n^3)$
 - ☐ D) Master Theorem does not apply
3. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 3T(n/3) + 3n^3 \log n$;
 - ☐ A) By case 3: $T(n) = \Theta(n^3 \log n)$
 - ☐ B) By case 2: $T(n) = \Theta(n \log^2 n)$
 - ☐ C) By case 1: $T(n) = \Theta(n)$
 - ☐ D) Master Theorem does not apply
4. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 4T(n/16) + 4 \log n$;
 - ☐ A) By case 3: $T(n) = \Theta(\log n)$
 - ☐ B) By case 2: $T(n) = \Theta((\sqrt{n}) \log n)$
 - ☐ C) By case 1: $T(n) = \Theta(\sqrt{n})$
 - ☐ D) Master Theorem does not apply
5. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 4T(n/2) + n^2 / \log n$;
 - ☐ A) By case 3: $T(n) = \Theta(n^2 / \log n)$
 - ☐ B) By case 2: $T(n) = \Theta(n^2 \log n)$
 - ☐ C) By case 1: $T(n) = \Theta(n^2)$
 - ☐ D) Master Theorem does not apply
6. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 5T(n/25) + (\sqrt{n}) \log(n)$
 - ☐ A) By case 1: $T(n) = \Theta(\sqrt{n})$
 - ☐ B) By case 2: $T(n) = \Theta((\sqrt{n}) \log^2(n))$
 - ☐ C) By case 2: $T(n) = \Theta(\sqrt{n})$
 - ☐ D) By case 3: $T(n) = \Theta((\sqrt{n}) \log n)$
 - ☐ E) Master Theorem does not apply
7. Use the Master Theorem, if possible, to solve the recurrence $T(n) = 2T(n/2) + n / \log n$;
 - ☐ A) By case 3: $T(n) = \Theta(n / \log n)$
 - ☐ B) By case 2: $T(n) = \Theta(n \log n)$
 - ☐ C) By case 1: $T(n) = \Theta(n)$
 - ☐ D) Master Theorem does not apply
8. Use the Master Theorem, if possible, to solve the recurrence $T(n) = T(n/2) + 2^n$
 - ☐ A) By case 3: $T(n) = \Theta(2^n)$
 - ☐ B) By case 2: $T(n) = \Theta(2^n \log n)$
 - ☐ C) By case 1: $T(n) = \Theta(n \log n)$
 - ☐ D) Master Theorem does not apply

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