

## Quiz 1

**Question 1 (2 points):** Show that  $5n^2 + 2n + 8$  is  $O(n^2)$

**Question 2 (8 points):** Give an expression for the runtime  $T(n)$  if you can solve the following recurrences using **the Master theorem**. Otherwise, indicate that **the Master Theorem does not apply**.

$$T(n) = 5T(n/3) + n$$

$$T(n) = 5T(n/3) + \log n$$

$$T(n) = 5T(n/3) + n^2$$

$$T(n) = 6T(n/3) + n^2 \log n$$

$$T(n) = 5T(n/5) + n/2$$

$$T(n) = 27T(n/3) - n^3 \log n$$

$$T(n) = 26T(n/3) - n^3 \log n$$

$$T(n) = 8T(n/2) + n/\log n$$

**Question 3 (2 points):** Use the iteration method to solve the following recurrence.

$$T(n) = 3T(n/3) + n$$

**Question 4 (3 points):** Use the recursion-tree method to solve the following recurrence.

$$T(n) = 3T(n/3) + n$$