Name: _____

1. (1 pt.)

    ○ **Read all material carefully.**
    ○ *If in doubt whether something is allowed, ask, don't assume.*
    ○ You may refer to your books, papers, and notes during this test.
    ○ E-books may be used *subject to the restrictions* noted in class.
    ○ Computers are not permitted, except when used strictly as e-books.
    ○ Network access of any kind (cell, voice, text, data, ...) is not permitted.
    ○ Write, and draw, carefully. Ambiguous or cryptic answers receive zero credit.
    ○ Use class and textbook conventions for notation, algorithmic options, etc.

    Write your name in the space provided above.

WAIT UNTIL INSTRUCTED TO CONTINUE TO REMAINING QUESTIONS.

Do not write on this page below this point.

Q	Full	Score
1	1	
2	14	
3	15	
total	30	

2. (14 pts.) Using the textbook's Figure 2.3 (page 37) as a model depict the operation of the textbooks' MERGE algorithm when invoked as

$$\text{MERGE}(A, 5, 8, 12)$$

where A is an array with the following elements (in index order, *starting with index 1*, following the textbook's conventions):

3 1 4 9 4 7 8 9 2 3 5 10

Indicate the **values of the variables** i, j, and k, by placing those labels at the correct position (as the textbook does). You do not need to indicate the colors as used in that figure.

Depicting **three iterations** of the first while loop in the pseudocode is sufficient.

3. (15 pts.) Solve the following recurrence using **any two** (your choice) of the three methods described in Chapter 3 of the textbook:

$$T(n) = 3T(n/3) + 3n + 9$$

Include sufficient details and explanations to make it obvious that you are following the methods properly.

[additional space for earlier material]