

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 ebooks.
- 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 in the following table.

Q	Full Score
1	1
2	9
3	10
4	10
total	30

2. (9 pts.) In the following Java fragment, assume that $n > 0$ and that values are small enough to avoid overflows.

- (a) What is the value of **s** after the outer for loop ends (as a function of **n**)? Provide as compact an answer as you can.
- (b) Provide an exact numerical answer for **n = 10**.
- (c) Briefly explain why both answers are correct.

```
1      int s = 0;
2      for(int i = n; i > 0; i -= 2) {
3          for(int j = i; j < i*i; j++) {
4              s += 1;
5          }
6      }
```

3. (10 pts.) Trace the execution of the BOTTOM-UP-CUT-ROD algorithm for $n = 10$ and the following pricing scheme. After each iteration of the outermost loop of the algorithm, depict the state of the array r . Indicate the optimal total price and corresponding locations of cuts.

length i :	0	1	2	3	4	5	6	7	8	9	10
price p_i :	0	3	4	5	11	16	17	19	22	27	29

4. (10 pts.) Trace the operation of the LCS-LENGTH algorithm (p. 394) on the sequences below. **Depict** the state of the b and c arrays (1) **after four iterations** of the outer nested loop and (2) **at the end** of the algorithm.

A A B A A B B B
A B A A B B A