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.
   - No computer or network access of any kind is allowed (or needed).
   - 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.

2. (5 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	2	3	7	8	9	14	15	16	17	20

3. (4 pts.) Provide pseudocode for *linear search*. The input is an array $A[1, 2, \ldots, n]$ of integers and another integer, v, which is the searched value. The output is *nil* if there is no array element equal to v; otherwise, it is the smallest index i such that $A[i] = v$.

4. (5 pts.) Sketch the proof of correctness of the pseudocode in Question 3 using appropriate loop invariants.