Homework #6

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For all questions, choose the **best** answer.

For questions 1 to 3, assume the following chart containing rod lengths to price:

length i	1	2	3	4	5
price p_i	2	3	5	7	8

1. What is r[5]?
    a. 8
    b. 9
    c. 10
    d. 11
    e. 6

R=[0, 2, 4, 6, 8, 10]

Rod length 5 has a max revenue equal to max revenue of length 4 (which is 8) and max revenue of length 1 (which is 2). 8 + 2 = 10

Cut is 4 pieces of rod length 1, which is max revenue 8. Plus 1 which is max revenue 2. In other words, 5 pieces of rod length 1.

2. Which of the following gives the max revenue to cut rod length 5?
    a. No cuts
    b. Five rods of length 1.
    c. Two rods of length 2 and one rod of length 1.
    d. One rod of length 4 and one rod of length 1.
    e. Two rod of length 4 and one rod of length 1.

3. What is the total max revenue if you had rod length 3 and rod length 4?
    a. 15
    b. 10
    c. 14
    d. 18
    e. 16

    r=[0, 2, 4, 6, 8, 10]

Array r tells us the max revenue per each rod length. Answer is 6+8 = 14

For questions 4 and 5, assume the following matrices and their corresponding dimensions:

A = 3 x 8
B = 8 x 10
C = 10 x 2
D = 2 x 4

4. If you wanted to conduct the multiplication ABCD, what is the minimum number of multiplications?

    a. 1920
    b. 2400
    c. 800
    d. 232
    e. 340

Options are:
(A(BC))D
A((BC)D)
A(B(CD))
(AB)(CD)
((AB)C)D

(A(BC))D:
BC = 8x10x2=160

A(BC) = 160 + 3x8x2 = 208

(A(BC))D = 208 + 3x2x4 = 232

A((BC)D):
BC = 8x10x2=160
(BC)D = 8x2x4 + 160 = 224
A((BC)D) = 3x8x4 + 224 = 320

Options A(B(CD)), (AB)(CD), and ((AB)C)D produce total multiplications greater than 232 as well. So the minimum is 232.

5. What is the ordering of matrix multiplication that would produce the minimum number of multiplications?
    a. (((AB)C)D)
    b. ((A(BC))D)
    c. (A(B(CD)))
    d. ((AB)(CD))
    e. (A((BC)D))