1. It is easy to solve the knapsack problem if ...

<u>All items have the same size (variable profits)</u>

For all the items, profit/benefit =1

All items have the same profit/benefit ratio

All of the above

2. The Improved algorithm for Knapsack was shown to provide 2-approx. Is this a tight analysis?

NO

<u>YES</u>

3. Assuming P != NP, the vertex k-center problem may have a PTAS

<u>False</u>

True

4. Assuming P != NP, the metric TSP problem may have a PTAS

False

<u>True</u>

5. If an NP-hard problem can be solved optimally in pseudo-polynomial time then...

it is weakly NP-hard

it is solvable in time polynomial in the input's unary size.

it may have a fully polynomial time approximation scheme

<u>All of the above</u>

6. Wrong question.

7. In Bin-Packing, if items can split between two bins, then the following is sufficient:

be able to split floor(sum si) arbitrary items.

be able to split ceil(sum si) arbitrary items.

be able to split the floor(sum si) largest items.

be able to split the ceil(sum si) largest items.

8. The knapsack FPTAS is run on 20 items, max profit =100 and eps=1/5. All profits are integers

If OPT=1000, the alg. may return value 850

If OPT=1000, the alg. may return value 750

An optimal solution is returned

If OPT=1000, the alg. may return value 500

9. In the knapsack DP (variant 1), M[i,x] >= M(i−1, x−wi) + bi because...

It is always possible not to pack the i-th item

the first i-1 items have total profit x-wi

if the i-th item is IN, all the first i-1 items are also IN

if the i-th item is packed, it adds bi to the profit

10. If sum_j a_j is very large, then when running Harmonic-k Hide answers

It is reasonable to select high k

the choice of k is not significant

It is reasonable to select low k

every bin will be full to capacity at least (k-1)/k - full