Let f, g be the functions defined as $f(n) = n^2 2^n$ and $g(n) = n2^n$.

Select one or more:

- $f \in O(g)$
- $f \in \Omega(g)$
- $f \in \Theta(g)$

In Turing Machines:

Select one or more:

- The presence of many tapes can make the class $\mathbf{DTIME}(n)$ different
- What can be computed in exponential time is different from what can be computed in polynomial time
- The presence of many tapes can make the class $\mathbf{P}$ different
- The class $\mathbf{EXP}$ can be equal to $\mathbf{P}$

The problem 3SAT is:

Select one or more:

- such that INDSET can be reduced to it, i.e., $\texttt{INDSET} \leq_p \texttt{3SAT}$
- $\mathbf{NP}$-hard
- In the class $\mathbf{EXP}$.
- Computable in polynomial time

Suppose a language $\mathcal{L}$ is both in $\mathbf{NP}$ and in $\mathbf{EXP}$. Then

Select one or more:

- $\mathcal{L}$ can even be $\mathbf{NP}$-complete
- The classes $\mathbf{EXP}$ and $\mathbf{NP}$ are maybe different.
- The classes $\mathbf{EXP}$ and $\mathbf{NP}$ are necessarily equal.
- $\mathcal{L}$ cannot be in $\mathbf{P}$

The notion of PAC-learnable concept class:

Select one or more:

- Needs to hold for every distribution $\mathbf{D}$ on the instance class.
- Cannot be reached when the underlying concept class is the one conjunctions of literals.
- Requires the output concept to have probability of error ε, in all cases
- Does not make any reference to the time complexity of the learning algorithm

Question **1**

Not yet answered

Marked out of 6.00

Flag question

Construct a deterministic TM of the kind you prefer, which decides the following language:

$$\mathcal{L}=\{w\in\{0,1\}^*\mid\mbox{w contains 10 as a substring}\}.$$

Study the complexity of TM you have defined.

Question **3**

Not yet answered

Marked out of 7.00

Flag question

We studied the problem CLIQUE. You are required to classify the subset THREECLIQUE of CLIQUE consisting of all the pairs $(G, 3)$. To which class does THREECLIQUE belong?

Question **2**

Not yet answered

Marked out of 7.00

Flag question

You are required to prove that the following function f is in $\mathbf{FP}$. To do that, you can give a TMs or define some pseudocode. The function is one that, given two lists $L = L_1, \ldots, L_n$ and $P = P_1, \ldots, P_n$ of rational numbers returns their scalar products.