Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

1) Consider the polynomial $f = (x + 2)^3$ over $\mathbb{Q}$. Let $\text{size}(f)$ be the minimal size of the circuit computing $f$. Then which of the following is true?
- $\text{size}(f) = \Omega(n^2)$
- $\text{size}(f) = \Omega(2^n)$
- $\text{size}(f) = \Omega(n)$
- $\text{size}(f) = \Omega(n \log n)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\text{size}(f) = \Omega(n)$

10 points

2) Suppose there is an ABP of size $n^2$ computing polynomial $f(x_1, \ldots, x_n)$ of degree $n$.
What will be the size of ABP computing degree-$\frac{n}{2}$ homogeneous part of $f$?
- $O(n^2)$
- $O(n^{2\cdot2})$
- $O(n^3)$
- It can have exponential size.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$O(n^3)$

10 points

3) Let $f(x_1, \ldots, x_n) = x_1 \cdots x_n$ over $\mathbb{F}_2$. Then how many monomials does $f(x_1 + 1, \ldots, x_n + 1)$ have?
- $O(n)$
- $O(n^2)$
- $O(2^{n-1})$
- $O(2^n)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$O(2^n)$

10 points

4) Suppose VP=VNP. What can be said about the optimal size of the circuit computing $\text{Perm}$?
- $n^{O(1)}$
- $2^{O(n)}$
- $O(n)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$n^{O(1)}$

10 points

5) Let $C$ be an arithmetic circuit computing a polynomial $f$. $\deg(C)$ is defined as the maximum degree of the polynomial computed by intermediate polynomials computed at each node in $C$.
What is the relationship between $\deg(f)$ and $\deg(C)$?
- $\deg(f) \ll \deg(C)$
- $\deg(f) \gg \deg(C)$
- $\deg(f) = \deg(C)$
- No such direct relation between $\deg(f)$ and $\deg(C)$ can be inferred without looking into the circuit.

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\deg(f) \ll \deg(C)$

10 points