Quiz 2

Write neatly. Be careful. No justifications required. Wrong answers will be penalized more than absent ones.

1. Define what it means for a Boolean formula ϕ to be *tautological.*

2. Is it the case that $\models (P \to Q) \vee (Q \to P)$? *(Recall $\models \phi$ means that ϕ is tautological.)*

3. How many satisfying assignments does the formula $\neg P \vee Q \vee \neg R$ have?

4. State "DeMorgan's law": $\neg(P \wedge Q) =$

5. Suppose that A, B, and C are sets. Is it the case that $A \in B$ and $B \in C$ implies that $A \in C$?

6. Let A be a set containing 10 elements. Which is larger, $A \times A$ or $\mathcal{P}(A)$?

7. Suppose that A, B, C, and D are sets and that $A \times B = C \times D$. Is it necessarilly the case that $A = B$ and $C = D$?

8. Define what is a *language* over an alphabet Σ.

9. Write a regular expression for the set of all nonempty strings over $\{0, 1\}$ that start and end with a 0.

10. Define what is a *relation*, R, over a set A.