SURPRISE QUIZ!!

CPSC 451

The University of Canvas

Every question must be answered *completely and correctly* in order to pass this test. **Answer all questions in the space provided.**

1. Compute the definite integral

\[
\int_0^\infty \left( \frac{3 \sin^4 x}{\pi x^4} + e^{-x} \ln x + \left( \frac{1}{1-e^{-x}} - \frac{1}{x} \right) e^{-x} \right) dx
\]

**Answer:** ____________

2. Give a construction using a ruler and compass for the trisection of an angle.

**Answer:** ____________


**Answer:** ____________

4. Reproduce the map of 1939 Europe and colour the map using at most three colours, so that no bordering countries have the same colour.

**Answer:** ____________

5. Prove that $P = NP$.

**Answer:** ____________

6. State and prove Fermat’s last theorem. Andrew Wiles’ proof is too easy, and may not be used here.

**Answer:** ____________

7. Prove that $P \neq NP$.

**Answer:** ____________

8. Disprove Church’s Thesis.

**Answer:** ____________

9. Give a program (written in C) to solve the halting problem.

**Answer:** ____________

10. Give a mathematical proof of the correctness of your program from Question 9.

**Answer:** ____________