QUANTUM ALGORITHMS
EXAM 2

PROF. MATTHEW MOORE

DUE: 2020-05-15

Instructions

- Solutions must be typed. Submit solutions by email.
- Solutions will be graded based on correctness, quality, and presentation. Turn in something that you are proud of.
- You may make use of any non-human assistance — any book, the web (but do not ask for help online), etc. Solutions must be self-contained.
- You may ask me questions about the problems.
- **You may submit a "draft" of your solution no later than 05-07.**

Problem: carefully write up Shor's algorithm.

You need not prove that the classical components succeed in finding a divisor with high probability, but you should include the statements of the theorems/lemmas giving bounds for the probability of success.

For the quantum components of the algorithm, include all the relevant calculations and circuits, including (if you choose to implement it this way) the phase approximation and the quantum Fourier transform. You should describe how the circuits work, their complexity, and your calculations should demonstrate that the circuits perform as required by the algorithm.