

MATH 555: KNOT THEORY, HOMEWORK 3

CLASSICAL INVARIANTS AND THE KAUFFMAN BRACKET

Due by Friday, Feb. 15th at 10 am

1. HOMEWORK POLICY

You are strongly encouraged to work in groups to exchange ideas and help each other understand how to approach problems, but the work you turn in must be your own! If you work with others on an assignment, be sure to indicate the names of the other students on your homework. Additionally, if you use any outside resources (i.e. internet sources, other mathematicians, other books) to help you solve homework problems, you must cite your sources. Failure to follow these rules will result in a score of zero on an assignment and may constitute a violation of academic integrity.

Homework must be legible, well-organized, and written in complete sentences. Handwritten work is fine, but you are encouraged to type up the problems in LaTeX.

2. READINGS AND RESPONSES.

- (1) Read Pages 46 to 51 of “Knots Knots” by Justin Roberts.

3. PROBLEMS

- (1) Find a knot that minimizes crossing number over all 3-bridge knots. Use the knot tables and theorems from class to prove you found a minimizer.
- (2) Use the outline provided in class to show that every knot with bridge number equal to 2 has width equal to 8.
- (3) If K and J each have bridge number equal to 2, prove that $K\#J$ has width equal to 14.
- (4) Calculate the Kauffman bracket of the standard diagram of the figure 8 knot.
- (5) Do Exercise 4.1.12 in “Knots Knots”.