

## Student Guide for POW 2: Tying the Knots

### 1. PROBLEM STATEMENT (6 pts)

#### a. Restate the story of the POW in your own words

- 0 – No story stated
- 1 – Story is copied from text
- 2 – Story is partially restated and partially copied
- 3 – Story is restated but lacks some necessary information
- 4 – Story was written in students own words and includes all necessary information

#### b. Restate the problem in your own words

- 0 – No problem stated
- 1 – Problem is copied from text or incomplete
- 2 – Problem is stated in student's words, and is clear and concise

### 2. PROCESS (16 pts)

#### a. Describe your initial ideas concerning the problem, explain

- 0 – No initial ideas expressed
- 1 - Poorly written/incomplete/vague statement of ideas
- 2 - Complete and thorough explanation of initial ideas

#### b. Describe how you worked on the problem, including the experiments you tried

- 0 – No methods described
- 1 – Poor overall description that is incomplete and vague, with no examples showing the experiments you tried
- 2 – A satisfactory description of your processes, with adequate examples showing the experiments you tried
- 4 – A complete and thorough description of your methods, with a comprehensive explanation of the experiments you tried

#### c. Describe how you kept track of your experimental results

- 0 – No description given
- 1 – A vague and incomplete description of an “unorganized system”
- 2 – A complete and thorough description that clearly organized data using a logical and sequential method

#### d. Provide all diagrams and sketches

- 0 – No diagrams provided
- 1 - Poor diagrams with little if any labels/explanations/comments
- 2 - Complete diagrams with clear and concise labels/explanations/comments

#### e. Describe all materials used and their purpose

- 0 – No description of materials used
- 1 – Incomplete description of materials, and no purposes given
- 2 - Complete description of materials, with in-depth discussion of purposes

#### f. Describe any problems you had, and how you solved them

- 0 – No description of problems encountered
- 1 – Vague and limited discussion of problems encountered
- 2 – Excellent discussion of several problems encountered, including a thorough record or your thought process used to deal with the problems

#### g. Describe all assistance provided and how it helped you

- 0 – No statement of assistance
- 1 – Clear statement of assistance with minimal description of how it helped
- 2 – Clear statement of assistance with a complete description of how it helped

**3. SOLUTION (8 pts)**

**a. State the probability for each possible outcome**

- 0 – No statement of outcomes with their probabilities
- 1 – Statement of most outcomes, but not all probabilities are correct
- 2 - Statement of all possible outcomes, and most probabilities are correct
- 4 - A statement of all possible outcomes, and all probabilities are correct

**b. Describe how you determined the probability of each possible outcome**

- 0 – No description given
- 1 – Poor and incomplete explanation of how you determined the probability of each possible outcome with missing and/or incomplete supporting materials
- 2 – Minimal explanation of how you determined the probability of each possible outcome, with minimal supporting material
- 3 – A satisfactory explanation of how you determined the probability of each possible outcome, with adequate supporting material
- 4 – A complete and thorough explanation of how you determined the probability of each possible outcome, with complete and thorough use of supporting material

**4. EVALUATION (12 pts)**

**a. State the difficulty level of the problem (scale of 1-10), explain**

- 0 - no explanation of level
- 1- minimal explanation of level
- 2 - Complete and thorough explanation of level selected

**b. Describe your personal reaction/opinion to the problem**

- 0 - no opinion or reaction stated
- 1 - a minimal statement with little support
- 2 - a well discussed statement of opinion/reaction

**c. Identify the best/worst parts of the problem**

- 0 - no identification of best/worst parts of exp
- 1 - minimal listing of best/worst parts of exp
- 2 - Complete and thorough listing of best/worst parts of exp

**d. Describe how the problem could have been made better for you**

- 0 – No description on the problem could have been improved
- 1 – A vague and limited statement how the problem could have been improved
- 2 - Several, well-support comments and suggestions regarding improvement

**e. Write a one paragraph summary of “what you learned from the problem”**

- 0 - No summary paragraph
- 1. A brief, poorly written summary that demonstrates little understanding of the problem, its solution and the mathematical ideas and concepts
- 2. A fair summary that includes some support, but lacks one or two key points that would have demonstrated understanding of the problem, its solution, and the mathematical ideas and concepts
- 3. A good summary that demonstrates an acceptable understanding of the problem, its solution and the mathematical ideas and concepts, however could be described in greater detail
- 4. A well written summary written that demonstrates a thorough understanding of the problem, its solution and the mathematical ideas and concepts

**5. SELF-ASSESSMENT (8 pts)**

**a. Grade and Justify your work using a self-assessment scoring rubric**

0 – Work not graded with rubric

1 – Score values provide with no justification

2 - Score values provide with minimal rational and many/most values not acceptable based on scoring guide criteria

3 - Scores values provided with fair/good rationales, but some values not acceptable based on scoring guide criteria

4 - Score values provided with strong rationales, all values acceptable based on scoring guide criteria

**b. Write a one paragraph summary that identifies your weakest areas in this POW and describe the problems you had or the reasons you become “stuck” in these areas**

0 – No paragraph written

1- A brief, poorly written summary that does not allow the reader the ability to understand why you had problems in specific areas of the POW and could not finish a problem, come to a solution, or make a generalization

2. A fair summary that is quite limited, and does not go into detail on problem areas and their specific reasons

4. A well written summary written that clearly identifies the weakest areas of the POW and describe the specific reasons that you had problems and how you will try to resolve these problems