Portfolio Assignments for Mathematics 396

There are three portfolio assignments. There are two parts to each assignment.

PART A
Write a word problem to illustrate a given prescribed problem solving strategy. The problem should require at least three mathematical steps to solve!

- The problem should be appropriate for grades levels 4 – 7.
- Include with each problem a rubric created specifically for the problem.
- Include a solution that would receive a perfect score according to your rubric.
- Include a section giving comments for teachers.
- Try to make the problems interesting and relevant to children's lives, and thus useful for you upon entry into the teaching profession.
- Try to write each problem ON YOUR OWN, without borrowing from other resources. Cite your reference if applicable.
- Have fun and use your imagination.

Please organize your writing in the following format:

- Problem
- Prescribed Strategy
- Problem Rubric
  - You must use a different rubric for each portfolio problem.
- Solution
- Comments for Teachers
  - Can include ideas for (a) extending or generalizing the problem, or (b) reflective comments about which topics this problem illustrates within the elementary or middle school mathematics curriculum.

Strategies

- **Portfolio 1**
  - **Strategy options** (choose one)
  - Draw a diagram (see chapter 1)
  - Make a systematic list (see chapter 2)
  - Eliminate possibilities (see chapter 3)

- **Portfolio 2**
  - **Strategy options** (choose one)
  - Look for a pattern (see chapter 5)
  - Identify sub-problems (see chapter 7)
  - Using counting techniques (see class activities)

- **Portfolio 3**
  - **Strategy options** (choose one)
  - Draw Venn diagrams (see chapter 12)
  - Work backwards (see chapter 10)
  - Analyze the units (see chapter 8)
PART B
For Part B you will be looking at Portfolio PART A written by a classmate.

1. Read their problem and solution. Score their problem according to the Problem Rubric they submitted.

2. Score their work according to the following Portfolio Class Rubric. Support your scores with comments. Use the Portfolio Part B Handout.

**Problem**: Possible 10 points (*Contains the wording of the actual problem*)
- 2 points for prescribing a strategy which is appropriate and efficient.
- 2 points for writing a problem that illustrates an important mathematical idea.
- 2 points for writing a multi-step problem that uses at least 3 steps.
- 2 points for an interesting story.
- 2 points for clarity and good use of language.

**Prescribed Strategy**: Possible 2 points
- 2 points for specifying the illustrated problem-solving strategy

**Problem Rubric**: Possible 6 points
- 3 points for a Problem Rubric clearly stating the expectations.
- 3 points for a Problem Rubric which appropriately assesses the problem.

**Solution**: Possible 4 points
- 4 points for a complete and correct solution that would receive full credit according to the Problem Rubric.

**Comments for Teachers**: Possible 2 points
- 2 points for complete and clear Comments for Teachers

### Portfolio Class Rubric

<table>
<thead>
<tr>
<th>Portfolio Class Rubric</th>
<th>3</th>
<th>2</th>
<th>1</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>Strategy</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Idea</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Multi-step (at least 3)</td>
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<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Story</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>States Prescribed Strategy</td>
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<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>Problem Rubric</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear expectations</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Appropriate assessment</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Solution</strong></td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>2</td>
<td>1</td>
<td>0</td>
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PART B continued

3. Final Comments
After scoring a peer problem, answer the following questions:
   a. What could be added to the problem to make it clearer or what information is
      unnecessary for the problem and does not add value?
   b. Give a specific, thoughtful suggestion on how to modify the problem to make it
      more difficult for an advanced learner.
   c. Give a specific, thoughtful suggestion on how to modify the problem to make it
      easier for a struggling learner.
   d. Comment on the Problem Rubric. Was it appropriate? Were there categories
      missing? List at least one change you would make to improve the rubric. Justify
      your change.

OVERALL PORTFOLIO GRADING

Part A will be graded by your peers using the Portfolio Class Rubric. The scores will be
reviewed by your instructor who may modify the scores.

Part B will be graded by the instructor according to the following Portfolio Instructor
Rubric:

   • (Step 1) Up to 4 points for scoring using the Problem Rubric written by your peer.
   • (Step 2) Up to 6 points for thoughtful grading using the Portfolio Class Rubric
     supported by appropriate comments.
   • (Step 3) Up to 8 points for complete, thoughtful and effective responses to the
     Final Comments questions.

<table>
<thead>
<tr>
<th>Portfolio Instructor Rubric</th>
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</thead>
<tbody>
<tr>
<td>1. Scoring with the Problem Rubric</td>
</tr>
<tr>
<td>2. Scoring with the Portfolio Rubric</td>
</tr>
<tr>
<td>Are the scores appropriate?</td>
</tr>
<tr>
<td>Are the scores backed up by comments?</td>
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<tr>
<td>3. Final Comments</td>
</tr>
<tr>
<td>Are all questions answered clearly and completely?</td>
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<tr>
<td>Are the answers to the questions thoughtful, appropriate and mathematically sound?</td>
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</table>