

Pre-Test

Problem Solving

1. The National Council of Teachers of Mathematics (NCTM) strongly endorses the idea that problem solving must be the focus of school mathematics. According to NCTM, a problem is:
 - a. a task which is in the form of a word problem.
 - b. a task for which a solution method is not known in advance.
 - c. a task which requires the application of a familiar algorithm.
 - d. a task which yields one solution.
 - e. a task which can be accomplished by every student in the class.
 - f. all of the above.
2. The steps of Polya's 4-stage problem solving model, in order, are as follows:
 - a. Read the Problem, Understand the Problem, Devise a Plan, and Review the Results.
 - b. Understand the Problem, Devise a Plan, Carry out the Plan, and Review the Results.
 - c. Read the Problem, Devise a Plan, Implement the Plan, and Review the Results.
 - d. Understand the Problem, Devise a Plan, Carry out the Plan, and Record the Results.
3. List four defining characteristics of a "good problem".
 - a. _____
 - b. _____
 - c. _____
 - d. _____
4. List four ways to change a problem to make it better.
 - a. _____
 - b. _____
 - c. _____
 - d. _____

5. Mark all characteristics that do **NOT** define *heuristics*.
 - a. Problem-solving heuristics develop naturally within each of us.
 - b. Heuristics include patterns of behavior (i.e., listing known and unknown facts, drawing a picture to represent the problem, underlining key ideas) that guide problem solving.
 - c. Heuristics include questions and prompts that can be asked during each stage of the problem-solving model.
 - d. Problem-solving heuristics are synonymous with problem-solving strategies.
 - e. Problem-solving heuristics are synonymous with problem-solving model.
6. In the area of problem solving (grades 6-8), the Texas Essential Knowledge and Skills (TEKS) objectives expect students to be able to perform the following **EXCEPT**:
 - a. Select tools (i.e., real objects, manipulatives, paper/pencil, technology) to solve problems.
 - b. Apply mathematics to investigations in other disciplines.
 - c. Communicate mathematical ideas using informal and mathematical language.
 - d. Select or develop an appropriate problem-solving strategy.
 - e. Utilize problem solving to learn new concepts.
7. The Underlying Processes and Mathematical Tools of the TEKS focus on which three areas of problem solving?
 - a. Select a strategy, carry out the plan, evaluate your work.
 - b. Select a plan, carry out the plan, justify the results.
 - c. Select a strategy, carry out the plan, communicate the results.
 - d. Apply mathematics, communicate ideas, and use logical reasoning.
8. In Grade 1 students are introduced to which problem-solving strategies?
 - a. Draw a picture, look for a pattern, use systematic guess and check, and act out the situation
 - b. Draw a picture, use systematic guess and check, eliminate unnecessary information, and act out the situation
 - c. Use systematic guess and check, make a table, draw a picture
 - d. Make a table, draw a picture, use systematic guess and check, and work a simpler problem

9. In Grade 3 students will develop which additional problem-solving strategy not learned in previous grade levels:
- Use systematic guess and check
 - Act out the situation
 - Make a table
 - Look for a pattern
10. The four mathematical tools found in the 6th-8th grade problem-solving TEKS are: real objects, manipulatives, technology, and ____.
- calculators
 - measuring devices (i.e., ruler, protractor, compass)
 - geometric models
 - paper and pencil
11. The three mathematical techniques found in the 6th-8th grade problem-solving TEKS are: mental math, estimation, and ____.
- logical reasoning
 - number sense
 - paper and pencil calculations
 - rounding
12. Which rubric focuses on the overall quality of the problem-solving assessment task?
- Holistic rubric
 - Analytic rubric
13. Which rubric provides more specific feedback about each stage of the problem-solving process?
- Holistic rubric
 - Analytic rubric
14. The main difference between formative and summative assessment is:
- formative assessment takes place at the beginning of the year while summative assessment takes place at the end of the school year.
 - formative assessment uses form tests while summative assessment adds all the test scores together.
 - formative assessment is used to direct teaching and learning whereas summative assessment is used to summarize overall achievement.
 - formative assessment takes place throughout the school year while summative assessment occurs predominantly at the end of the school year