OCTOBER 2023
EBS 417
MATHEMATICAL INVESTIGATIONS
30 MINUTES

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FOURTH YEAR, SECOND SEMESTER MID-SEMESTER QUIZ, OCTOBER 2023

26TH OCTOBER 2023 MATHEMATICAL INVESTIGATIONS 8:00 AM – 8:30 AM

Answer ALL the questions.
[20 MARKS]

For items 1 to 19, each stem is followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. The Greek word, ***problema***, means to .....
   A. be thrown forward.
   B. be thrown up.
   C. carry forward.
   D. carry something.

2. A task where students know what is asked and the formula to use is referred to as a/an .....
   A. exercise.
   B. investigation.
   C. problem.
   D. test.

3. Which of the following tests **must** a good mathematics problem pass?
   I. It should have no solution.
   II. It should be mathematically interesting.
   III. The task elicits from students key mathematical concepts.

   A. I only
   B. II only
   C. I and II only
   D. II and III only

4. Which of the following is/are a characteristic(s) of a good mathematics problem?

   I. No solution
   II. High cognitive demand
   III. Multiple entry points
   IV. Context-free

   A. I only
   B. II only
   C. II and III
   D. II and IV

5. The definition of problem solving as "finding the unknown means to a distinctively conceived end" is attributed to which of the following individuals?
   A. Harrison
   B. Mason
   C. Polya
   D. Wood

6. The question, "Is there an identified pattern" relates to which of the processes as proposed by Polya?
   A. Carrying out the plan
   B. Devising a plan.
   C. Looking back
   D. Understanding the problem

7. After solving a task, the student reflected on the following question, "is this the desired result?" What the student did falls under **Step** ..... as outlined in the *Six-Step Model.*
   A. five
   B. one
   C. six
   D. three

8. Which of the following is the **most** accurate statement regarding posing a worthwhile problem?
   A. Enables students to make relationships between mathematical concepts.
   B. Should have the potential to be solved by students using a memorized procedure.
   C. The problems selected should involve words and nothing else.
   D. There should be agreement among students that there is one correct answer.

9. Which of the following represents worthwhile features of tasks or problems for learning mathematics?

   I. Problematic
   II. Algorithmic
   III. Concept formation
   IV. Relevant

   A. I and II only
   B. I and III only
   C. I, II and IV
   D. I, II and IV only

10. Which of the following questions should a teacher ask himself or herself when selecting, designing or adapting a worthwhile task? Does it .....
    A. have potential for students to demonstrate mathematical understanding?
    B. only require or need the use of one problem-solving strategy?
    C. require more than one class period to solve?
    D. require students to activate prior knowledge?

11. Which of the following is/are challenge(s) associated with implementing problem-solving teaching approaches in the mathematics class?
    I. Coverage of topics
    II. Students' excitement
    III. Teacher discomfort
    IV. Ability of students

    A. II only
    B. IIII only
    C. I, II and III only
    D. I, III and IV only

12. Which of the following are the roles of the mathematics teacher when helping students develop problem solving skills?
    I. Modelling a useful strategy
    II. Linking errors to misunderstandings
    III. Promoting students' dependence on the teacher

    A. I only
    B. II only
    C. I and II only
    D. II and III only

13. *Anticipated outcome* means .....
    A. checking your solution.
    B. determining that there is a blockage.
    C. determining what the task is about.
    D. identifying possible strategies worth trying.

14. Which of the following is an instructional example of teaching ***through*** problem solving?
    A. Asking students to find the area of a triangle using concrete materials and then generalizing their process.
    B. Having students develop their own word problems that use a recently learned algorithm.
    C. Providing students with a list of area formulas and asking them to find the area of a given rectangle.
    D. Teaching students the algorithm for fraction division and then asking them to find out how many servings of $\frac{1}{3}$ pizza could be made from $3-\frac{2}{3}$ pizzas.

15. Teaching **through** problem solving benefits all students in what way? Focusing .....
    A. on procedures that will effectively find answers.
    B. on the single strategy needed to solve most problems.
    C. on the technology that will guide them to solutions.
    D. students on ideas and sense making.

16. Which statement **best** reflects the approach of teaching through problem solving? It .....
    A. is a very effective way to help students' procedural fluency.
    B. is the method rarely used in traditional textbooks.
    C. usually involves students exploring alternative methods of solving a story problem.
    D. usually requires a teacher explaining and providing practice of an identified skill.

17. After the teacher had demonstrated the procedure to use in solving given exercises, students were given word problems to solve. This is an example of teaching ..... problem solving.
    A. about
    B. as
    C. for
    D. through

18. A student after being presented with a problem responded with the correct answer immediately but could **not** explain how she obtained the answer. Which of the following strategies used in problem solving is exemplified by the student's response?
    A. Checking for the reasonableness of answers
    B. Conjectures
    C. Looking for a pattern
    D. Visualising

19. In the I.D.E.A.L model, the 'D' stands for define the .....
    A. goals.
    B. outcomes.
    C. problem.
    D. strategies.

Item 19 is a statement followed by True and False options. Read the statement carefully and indicate whether it is True or False by circling the letter of the correct option.

20. A heuristic is a strategy that is independent on a particular topic that helps problem solvers approach and understand a problem.
    A. True
    B. False