

TWENTY-EIGHTH ANNUAL MATHEMATICS CONTEST
Sponsored by
THE TENNESSEE MATHEMATICS TEACHERS' ASSOCIATION

ALGEBRA II 1984

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Scoring Formula: $4R - W + 40$

This test was prepared from a list of Algebra II questions submitted by the Tri-Cities State Technical Institute.

DIRECTIONS:

Do not open this booklet until you are told to do so.

This is a test of your competence in high school mathematics. For each problem there are listed 5 possible answers; one and only one is correct. You are to work each problem, determine the correct answer, and indicate your choice by making a heavy black mark in the correct place on the separate answer sheet provided. You must use a pencil with a soft lead (No. 2 lead or softer).

This test has been constructed so that most of you are not expected to answer all questions. Do your very best on the questions you feel you know how to work. You will be penalized for incorrect answers, so it is advisable not to do much wild guessing.

If you should change your mind about an answer, be sure to erase completely. Do not mark more than one answer for any problem. Make no stray marks of any kind on your answer sheet. The answer sheets will not be returned to you. If you wish a record of your performance, mark your answers in this booklet also. You will be able to keep this booklet after the test is completed.

When told to do so, open your test booklet to page 2 and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

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39. For what positive values of a and b is

$$\frac{(a^2 + b^2)}{(a + b)} \geq 2(a^{-1} + b^{-1})^{-1}.$$

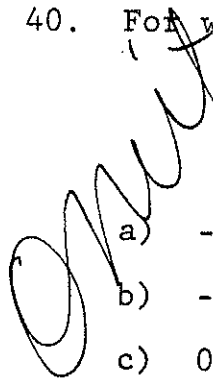
- a) All positive a, b
- b) When $0 < a \leq 1, 0 < b \leq 1$
- c) When $a^2 + b^2 \leq 1$
- d) When $a^2 + b^2 \geq 1$
- e) Only when $a = b$

40. For what value of k does the system below have a solution?

$$2x + 3y = 1$$

$$3x + 5y = 1$$

$$x + y = k$$

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- a) -2
 - b) -1
 - c) 0
 - e) 1
 - f) 2