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An evaluation of the Indiana Mathematics Contest Program

Charles A. Orahood
Indiana State University

AN EVALUATION OF THE INDIANA MATHEMATICS CONTEST PROGRAM

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Committee on thesis:

Vesper D. Moore
Marguerite Hale
Inez Morris, Chairman

Representative of the English Department:

Helen McGaughey

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS USED

The Mathematics Achievement Program in the state of Indiana has been in progress continuously for twenty years. After such a period, it is well to evaluate the program and find the reaction of teachers and students to it. Many teachers have stated their opinions regarding the program, but in no instance have data been collected concerning an evaluation of the achievement program.

I. THE PROBLEM

Statement of the problem. This study was made to find the opinions of mathematics teachers and mathematics students concerning the worthiness of the Mathematics Achievement Program regarding (1) benefits received by students and teachers, (2) the reason more schools do not participate, (3) ways of improving the program and (4) attitudes in general toward the program.

Importance of the study. The Mathematics Achievement Program is an annual event in the state of Indiana. Every secondary school or its equivalent, such as military academies, parochial schools, and schools for the handicapped, has the opportunity to enter students in contests of first year algebra, plane geometry, and comprehensive mathematics. The comprehensive test includes first year algebra, advanced

algebra, plane geometry, and trigonometry and may be taken by students rated as juniors or seniors.

Regional contests are conducted in assigned centers throughout the state on the last Saturday of March. Sealed tests, mailed from Indiana University, are opened by the contest chairman before the participating students. The students are given allotted time to complete their examination. The examinations are graded by the participating teachers at the regional center. Controversial problems such as geometric propositions and constructions are returned ungraded along with the graded tests to Indiana University. The papers are rechecked and results are mailed to all participating teachers.

The facilities at Indiana University are limited to about one thousand contestants in the complete achievement program comprising mathematics, Latin, and English. Only the winners from each regional center, and as many other high ranking contestants as can be accommodated, participate in the state finals at Indiana University on the last Saturday in April.

Instructors are sent seat numbers for their students before the day of the contest. The students assemble in a large room to take their tests in their respective subjects. An allotted time is given the students for completing the examination.

While the students are taking their examinations, the

teachers assemble to discuss questions relating to the contest. It was from these meetings that the author learned of many of the problems and questions arising from the contest.

Teachers grade the examination papers with two teachers grading and checking each other on each particular division of the test such as construction, propositions, multiple choice, numerical problems, etc. The students, during this time, may attend a baseball game, tennis match, may dance in the Union Building or observe various mathematical films and exhibitions.

All personnel assemble in the Hall of Music for the afternoon program of entertainment by the university students and for the presentation of awards.

It has become traditional to give three gold medals in each divisions, although there are times when, for some reason, one, four, or five are given. Two awards would represent a tie. Silver and bronze medals are awarded in a proportion of one to three, so that a total of 20 to 25 per cent of the participants in each contest get some type of recognition. The names of the top 80 or 85 per cent of the contestants in the finals appear on mimeograped forms that are distributed widely. This publicity in itself is a form of recognition.

The persons to receive medals are chosen by committees of teachers who have the lists of scores before them and who consider such things as closeness of consecutive scores, numbers in the high, low, and medium brackets, and other things

that merit consideration when choosing persons to be rewarded.

The purposes of the program are to encourage and reward superior talent. Furthermore by school participation in the contest the program hopes either directly or indirectly to interest students in greater scholastic effort and higher education.

The program, to fulfill these purposes, should be evaluated on the basis of favorable or unfavorable results it has produced. Since a majority of the schools in the state do not enter, it is essential to find reasons why teachers from these schools do not participate.

Doubtless, every school has students who excel in mathematics. Some teachers recognize these students through their participation in the contest; others do not. It is important, then, that the achievement program be evaluated through the estimation of students and teachers as to its worthwhileness and to find what benefits, if any, have accrued to the competing students.

II. DEFINITION OF TERMS USED

Achievement program and contest. These terms will be used synonymously throughout this paper. Popularly this event is known as a contest. Officially it is known as the High-School Achievement Program.

Comprehensive mathematics. This classification refers

to that part of the program which includes first year algebra, plane geometry, advanced algebra, solid geometry, and trigonometry.

III. ORGANIZATION OF REMAINDER OF THE THESIS

In Chapter II methods are discussed for selecting the various persons to whom questionnaires were sent. The number of questionnaires mailed and the percentage of returns are also given.

Chapter III deals with the questionnaire sent to the participating students and the results obtained.

In Chapter IV the returns and results from the questionnaire sent to participating teachers are discussed.

Chapter V explains the results of the questionnaire sent to non-participating teachers. Included in this chapter is a list of reasons given by teachers for not entering their students in the program.

In the last chapter a summary of the findings, conclusions and recommendations are made by the author.

CHAPTER II

METHODS USED IN THIS STUDY

To evaluate the program, it was decided to compare opinions of participating teachers, non-participating teachers, and competing students. A list of the schools which did not participate in the 1951 Achievement Program as well as the entrance blanks of all participating schools was secured from the Division of Adult Education of Indiana University.

Names of mathematics teachers from the schools that did not participate were secured from the 1950-51 Indiana School Directory. The names of participating teachers and students were obtained from the regional contest entrance examination forms.

In the first selection of names from the contest forms, duplication of schools was held to a minimum by careful examination of the selected names and substitution of other names where one school might have received more than one questionnaire. The number of students questioned in relation to the number of teachers was kept near the ratio of two to one.

After this first selection, the entrance blanks were checked again , and the schools which were not selected the first time were also included. The goal was to question at least one non-participating teacher, one participating teacher, or one participating student from each secondary school in Indiana. The greatest number of student's names was

selected from comprehensive mathematics, then from those in geometry, and last those in algebra. It was felt that the response from juniors and seniors would be most complete, since there was the distinct possibility that they might have participated in previous contests at least twice and in some cases four times. Forty per cent of the students selected were from the comprehensive area, 34 per cent from the geometry area, and 26 per cent from the algebra.

The table on page eight shows the number of questionnaires sent, the number returned, and the percentage of returns.

TABLE I

STATISTICS ON QUESTIONNAIRES SENT

To whom sent	Number sent	Number of returns	Per cent of returns
Participating teachers	143	99	69.2%
Participating students	294	194	64.9%
Non-participating teachers	523	236	44.1%
Unclaimed		13	
	960	542	56.2%

CHAPTER III

PARTICIPATING STUDENTS

This questionnaire[1] was sent to students who had participated in the 1951 Achievement Contest. It was the aim of this questionnaire to evaluate the participants' reaction to the program. First, did the contest stimulate the student to put forth a greater effort academically? Second, did the student feel the reward to be worth the effort? Third, was the contest attractive to students with varied interests? Table II shows the complete response to the questions.

In the first question, 100 per cent of the students considered it an honor to be in the contest, and all but five, in answer to question two, stated that it was worth the time spent in preparation.

It is important to note that in answering the third question 92 per cent of the students say that through contest participation they became conscious of the value of effort in scholastic work. Furthermore the responses to question four revealed that 85.5 per cent were stimulated to put forth greater effort in the study of mathematics.

In general, the students answered the questions merely by yes and no, but added comments on questions four and five

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[1] See appendix.

TABLE II

YES AND NO PORTION OF QUESTIONNAIRE
TO PARTICIPATING STUDENTS

Question	Number of yes	Number of noes	No ans.
1. Do you consider it an honor to participate in the state contest?	194	0	0
2. Was it worth the time spent in preparation?	189	3	2
3. Did participation in the contest help you see the value of scholastic achievement?	179	13	2
4. Did your interest in the contest stimulate you to put forth greater effort in mathematics?	166	26	2
5. Did preparation for the contest result in neglect of other subjects?	11	181	2
6. Did you receive special coaching or help from your instructor?	105	86	3
7. Did you feel you were competing on an equal basis with other students in the contest?	110	83	1
8. Have you received any honors in school such as music, language, athletics, etc.?	123	70	1
9. Do you think the contest can be improved?	105	75	14

gave evidence that several students were stimulated to work harder in other subjects as well as in mathematics. Only one student stated that perparation for the contest caused dislike for mathematics, while others stated that they became more interested in that particular field. Of the contestants who returned their questionnaires, eleven enrolled in colleges or universities in the fall of 1952. Two students majored in mathematics as the direct result of the program, and one stated the program had done more for him than any other thing in his high school career.

In question number six, 55 per cent of the students reported that they received special help which ranged from the teachers answering the students' questions to the teachers spending extra hours of help with them.

Considerable comment was made in answer to the seventh question as to the unfairness of competition. Some students from small schools stated they felt the larger schools were at a definite advantage because they were allowed more contestants, and they provided more individual coaching through special classes by the teachers. In spite of these comments by students from the smaller schools, 55 per cent of the students stated that competition was generally on an equal basis.

The eighth question was designed to find whether or not the students who participated in the contest also participated in extra-curricular school activities or were essentially devoted to textbook learning. The responses showed

TABLE III

NUMBERS OF AWARDS RECEIVED BY CONTESTANTS

Awards	Number	Per cent
Specific scholarship	68	35%
General scholastic	40	21%
Speech, dramatics, journalism	20	10%
Music	50	26%
Athletic	50	26%
Other	17	9%

that 64 per cent of the students have received other awards. The results are shown in Table III. For brevity, all academic subjects such as English, Latin, mathematics, history, and others were listed under Specific Scholarship. Scholarship awards were listed under General Scholastic. Awards listed under Others includes 4-H ribbons, judging, DAR awards, and others of a similar nature.

Interesting comments in response to question nine regarding ways to improve the contest are as follows:

1. There should be a greater number of awards in the forms of medals made to high-ranking mathematics students as stimulus to others to enter the contest and to improve their proficiency.

2. There should be more publicity by participating schools.

3. Could we see college classes in action on the day of the contest?

4. The judges should announce the scores of students receiving awards.

5. Why not have more and easier problems with fewer formal proofs.

6. It would be fairer to have one contest for third year students, and one for the fourth year students.

7. Provide some way for students to become better acquainted while waiting for the scores. (This has been improved since the survey was made.)

8. In the interest of a fair contest, eliminate all special coaching.

9. Try to have less confusion by monitors during the test period.

10. It was a swell program and well managed.

11. More interest should be shown by small schools.

12. Could there be a more consistent grading system? (This difficulty is explained in the introduction.)

13. Divide the schools into divisions according to size, and while giving the same examination, present ranking awards to each division to encourage small school participation.

CHAPTER IV

PARTICIPATING TEACHERS

A questionnaire[2] was sent to one hundred forty-three of the teachers who had students in the 1951 contest. Their names were selected from entrance forms. It was felt these teachers through their experience could give authoritative replies and suggestions concerning the program. In the 1950-51 school year, about 37.5 per cent of the schools in Indiana participated in the contest.

Table IV gives the questions that are answered yes or no, with the number of replies. The other questions will be listed as they are discussed.

The first question, "How many years have you participated in the program?", is answered in Table V, page seventeen.

In the second question, "Do you participate (1) every year, (2) only when you have outstanding students?", the purpose was to see if the contest was attractive only to teachers having outstanding students, or it was entered regularly as a help to the better students. Eighty responses stated the teacher participated every year while sixteen stated they participated only when they had outstanding students. Three gave no answer. Since 80 per cent of the ninety-six teachers participate regularly, they must consider

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[2] See appendix.

TABLE IV

QUESTIONS ANSWERED YES AND NO
BY PARTICIPATING TEACHERS

Question	Yes	No	No answer
4. Do you feel the time expended on your part is justified by the results you have obtained?	84	10	5
5. Do you believe the program is an incentive for students to be more industrious?	76	17	6
8. Do you feel the program warrants school time?	58	30	11
9. Do you regularly receive your announcement concerning the program?	85	13	1
10. Does your school pay your enrollment fee?	83	15	1
11. Is it the policy of your school to encourage participation in contests other than music and athletics?	88	11	0
12. Do you believe small and large schools benefit in fair proportion?	67	25	7

TABLE V

YEARS OF PARTICIPATION BY TEACHERS IN PROGRAM

Years of participation	Number of teachers
1	10
2	7
3- 6	38
7-10	16
11-19	17
20	5
uncertain	6
Total	99

the program of definite value.

Question number three, "Is your motive (1) to give a feeling of accomplishment, (2) desire to win?", was asked to find why teachers entered the contest. Since the percentage of winners is so small, it was thought to find out if letting the students compete in the contest would produce satisfying results. A feeling of accomplishment was given by 78 per cent of the responses as the motive for entering.

Time must be given by the teacher to the competing students. This takes the form of additional help beyond class instruction and the contest time on Saturdays. Extra time spent is voluntary on the part of the teachers. The fourth question on Table IV, indicates that teachers feel that their time is well spent since 84.8 per cent think the results obtained justify the time and effort expended.

Of the teachers answering question five, 77.7 per cent indicated they felt the program causes the student to be more industrious in his work. This result agrees with questions three and four answered by the students. See Table II on page ten for these results.

The sixth question was asked to find the basis on which the contestants were selected. Table VI on page nineteen gives these results.

Opinion, expressed by teachers in meetings conducted while students took their tests, indicated that in preparing

TABLE VI

THE BASIS OF CONTESTANTS' SELECTION

Method	Affirmative response
1. Teacher judgment	21
2. Preliminary examination near the beginning of the year	5
3. Preliminary examination near the contest date	80
4. Other	15

for this contest, some teachers were pointing their best students toward the contest from the beginning of the school year. This practice has been the subject of much criticism on the part of the program chairman and many of the participating teachers. The reason for this criticism is that the program was designed to encourage achievement on the part of all the students. In a few known instances, class time was devoted wholly to these special students to the detriment of the remainder of the class. It was the intention of question seven to determine how long before the contest the participants were chosen. The results are shown in Table VII. Indications show that most teachers select their contestants within a month of the regional contest. The results in Table VII might indicate that the criticism given would apply to a very limited number of cases.

The question of conducting the program during school time has arisen at various meetings of the teachers. Inasmuch as school time is allotted for other pupil activities, it was felt by some teachers that this program warranted school time. Question number eight asks, "Do you feel the program warrants school time?" Fifty-eight and one-half per cent of the teachers responding were in favor of using school time.

This program does not receive the publicity and support afforded athletics and music. Since a small number of students in each school is affected, the administration sometimes fails

TABLE VII

THE LENGTH OF TIME BEFORE REGIONAL CONTEST TEACHERS CHOOSE CONTESTANTS

Time of selection	Teachers responding in affirmative
1 week or less	13
2 weeks	17
3 weeks	22
4 weeks	32
2 months	11
no set time	2

to stress the contest. Many teachers have stated that they have failed to receive information concerning the contest, and if they do enter, they secure their information from other teachers. Some teachers have to pay the enrollment fee for their students. Many receive no encouragement from the administration. Question nine, ten, and eleven are respectively: (1) Do you regularly receive announcements concerning the program? (2) Does the school pay your enrollment fee? (3) Is it the policy of your school to encourage participation in contests other than athletics and music? The facts are that announcements concerning the program are sent to every secondary school in the state by the Division of Adult Education of Indiana University. Eighty-six per cent of the teachers regularly receive their announcements concerning the program, eighty-four per cent of the schools pay the enrollment fee, and 89 per cent of the schools encourage participation in these contests.

At various times, some teachers have indicated that the schools should be placed in divisions according to size, because they feel the larger schools receive the greater benefits of participating. The twelfth question, "Do you believe small and large schools benefit in fair proportion?" was answered yes in 68 per cent of the replies.

In commenting on question twelve, those among the 68 per cent answering yes felt that all students receive equal

TABLE VIII

NUMBERS ATTENDING SCHOOLS OF TEACHERS
RESPONDING TO QUESTIONNAIRES

Size of school	number responding
1-250	54
251-500	22
501-1000	9
1001-2000	8
2001-3000	3
over 3000	1
no reply	2
Total	99

benefits by participating in the contest and associating with other students of similar interests in mathematics. Some teachers felt every student should receive a medal for competing in the final contest and that too many winners from large schools is discouraging to both teachers and students from the smaller schools.

In order to see the sizes of the schools of those responding to the questionnaire, it was thought each recipient should circle the size of his school. Table VIII indicates the results of this question. Seventy-seven per cent of the replies came from the smaller schools, or schools having an attendance of from one to five hundred students in the upper four grades.

Question number fourteen was stated to include some of the important purposes for teachers' entering students in the contest. The five stated purposes in the question were to be listed in order of importance according to the personal view of the teachers being interrogated. Table IX shows the purposes with the order of importance according to the responses.

This table indicated that encouraging superior talent is decidedly the most important purpose, as it was selected first forty-three times, with a gradual decrease in its order of importance. Close in importance is the fifth purpose, enlarging the students' concepts of educational values.

This survey would indicate that teachers are interested

TABLE IX

REASONS GIVEN BY TEACHERS FOR ENTERING CONTEST

Reason	Order of importance with number of responses to each				
	1	2	3	4	5
1. Professional improvement of the teacher.	5	4	7	7	57
2. Comparison of students' achievement.	19	12	16	34	8
3. Identification of superior talent that should receive encouragment.	43	23	16	9	4
4. Stimulation of better study habits.	15	26	18	14	11
5. Enlargement of the students' concepts of educational values.	15	23	29	17	2

in the contest primarily to aid the outstanding students in furthering their education and that the contest is of minor importance for the teachers' own personal improvement.

The participating teachers included many comments of which the following are typical.

1. Not enough students are included from larger schools in comparison to those from smaller schools.

2. There is an uneven distribution and emphasis of subject matter in the examination from year to year.

3. Too many teachers argue on the answers to questions such as labeling the answers, leaving fractions in improper form, etc., during the grading at the regional contests.

4. Contest is a good motivation for college interest.

5. All time spent is to good advantage for student and teacher.

6. Time limit on the examination is too short for the number of questions.

7. Contest puts too much stress on grades and studying for a particular contest.

8. The contest gives teachers an opportunity to compare their students' progress with those of other schools.

CHAPTER V

NON-PARTICIPATING TEACHERS

In the school year 1950-51, there were five hundred twenty-three schools which did not participate in the Mathematics Contest. This tabulation amounts to 63.5 per cent of the schools in the state. A questionnaire was sent to every secondary school, with the exception of those for handicapped children, to find why they did not participate and to obtain suggestions that might be used to encourage more schools to be active in the program.

Table X lists the first eight questions with the number of responses to each.

There was absolutely no accurate way to determine if a school had ever participated. However, the responses indicated that 75 per cent of the schools responding did not participate in the 1951 contest. In some cases, the yes answer was a result of teachers changing positions during the summer, before corrections were made in the school directory. A school might never have participated in the program, yet the teacher could have been active in a previous position.

Most mathematics classes produce students who do superior work in the subject, therefore identifying themselves as being outstanding. The second question, "Do you believe in rewarding academic achievement?", was answered yes by

TABLE X

QUESTIONNAIRE FOR TWO HUNDRED THIRTY-SIX NON-PARTICIPATING TEACHERS WITH THE RESPONSES TO THE FIRST EIGHT QUESTIONS

	Yes	No	Some-times	No ans.	Don't know
1. Do you participate in the program?	37	178	18	3	0
2. Do you believe in rewarding academic achievement?	228	4	0	3	1
3. Do you believe competition with others stimulates academic achievement?	224	4	2	4	2
4. Do you believe this is the right kind of stimulation?	156	33	1	23	23
5. If you do not participate in the contests, would you if they were conducted during school time?	68	90	1	52	25
6. Do you feel this program interrupts your school program?	60	130	0	33	13
7. Do you regularly receive announcements concerning this program?	124	95	2	12	3
8. Is it the policy of your school to encourage participation in contests other than athletics and music?	126	93	0	8	9

96.6 per cent of the teachers. This question was asked to determine if the teachers felt these superior students should be encouraged.

Question number three, "Do you believe competition with others stimulates academic achievement?", brought yes in 95 per cent of the responses..

The fourth question, "Do you believe this is the right kind of stimulation?", was to determine if competitive programs might be a proper stimulus to inspire students toward better scholastic achievement. The responses were 66 per cent yes, while 14 per cent were no.

Inasmuch as the program is conducted on Saturdays, students and teachers might be kept from participating. The fifth question, "If you do not participate in the contest, would you if they were conducted during school time?", was asked to see if this could be an important factor in causing teachers to refrain from participation. The responses stated that 28.7 per cent would participate if the contest were held during school time, while 38 per cent stated they would not. Many teachers could not state yes or no because they did not know the school policy. There were 22 per cent no response to the question.

Selecting students and perhaps giving outside help to the participant occupies extra time of the teacher. This fact along with the teaching load might cause neglect of other

students and also cause interruptions in the school program. The sixth question, "Do you feel the program interrupts your school program?", was answered no by 55 per cent of the teachers, while 26 per cent stated it did interrupt the regular program.

As was explained in a previous chapter, announcements concerning the program are mailed to the head of the mathematics department of each high school listed in the Indiana School Directory in the late winter. Question number seven, "Do you regularly receive announcements concerning the program?", was answered no by 39.6 per cent of the teachers. Fifty-two and five tenths per cent stated they did receive announcements. Several of the returned questionnaires stated that the teachers had been instructing for several years and did not know the program existed. Others stated that they thought the letters containing the announcements were discarded before reaching the teacher's mailbox. This information seems to give definite indication as to why teachers do not participate. Several of the letters wanted immediate information concerning the program and inquired as to whom they might contact for particulars.

In question number nine, "If the answer to number seven is no, do you know why not?" the response was 54 per cent no. This response indicated that 56.8 per cent of the teachers who answered no in number seven did not know why they failed

TABLE XI

REASONS GIVEN BY TWO HUNDRED TWO TEACHERS FOR NOT PARTICIPATING IN THE CONTEST

Reason	Number of responses
Uninformed	32
No interest	30
Students not good enough	27
Lack of time	21
Work with too few students	15
Teaching load too heavy	14
No encouragement from administration	11
Too much expense for teacher	11
Competition not fair	7
School too small	6
Work directed toward contest objective	6
Other contest on that day	5
Special instruction given contestants	4
Failed to prepare in time	3
Students devote energy to one thing	3
Not familiar with program	2
Against school policy	2
First year teaching	2
No teacher willing to assume responsibility	1

to receive announcements. Other references to the question indicated the teachers were not too clear as to why they had failed to receive announcements. Four stated the letters might be discarded before reaching the teachers. The latter answer is possible since the mail is sent second class and often to the department and not to the individual. Another comment was that the principal took care of announcements and did not pass on the information.

Of the two hundred thirty-six questionnaires returned, there were thirty-four who failed to answer the tenth question, "If you did not participate last year, what were your reasons?" Eighty-five and six tenths per cent responded to this question, which was framed to find specific reasons why teachers failed to participate in the contest. Table XI gives the results of this question.

The eleventh question was to state the size of the school enrollment from which the responses were received. Table XII gives this information.

The last question was asked to ascertain the teachers' ideas concerning the program. To avoid too much duplication, the ideas already expressed in questions seven, eight, and nine were omitted.

Nineteen responses stated that too much coaching and special attention, given to some students, is unfair to others.

Seven teachers stated there was usually a conflict with

other school activities, and five felt the contest should be conducted on school time.

Four returns expressed the suggestions that schools should participate according to size and then receive division awards.

Twelve teachers thought the program was well conducted and of beneficial value to the student.

Four responses suggested more publicity via press, radio, television, State Department of Education, and posters for schools.

Other suggestions were to make the contest fair for all, permit only one entry from each school, and allow only winners from the county to participate in the finals. The latter suggestion stems from present enrollment regulations; some good students from small schools are not permitted to compete in regional contests. At the same time, large schools may have a number of entries whose scores permit them to compete in the finals but who actually are not as good scholastically as those barred from competition. This unfairness might be corrected by permitting the regional contest a larger number of entries, while still limiting the number eventually going to the finals.

Some teachers expressed the desire that others grade the papers rather than participating teachers. Still other teachers felt there were not enough scholarship advantages

TABLE XII

ATTENDANCE AT SCHOOLS OF NON-PARTICIPATING TEACHERS RESPONDING TO QUESTIONNAIRE

Size of school	Number of responses
1-250	178
251-500	25
501-1000	13
1001-2000	15
2001-3000	0
3001 and over	2

to encourage the students to enter the contest, while some thought too few students take part to make the time spent worthwhile.

CHAPTER VI

SUMMARY

The preceding chapters have given the findings of the replies to individual questionnaires answered by students, participating teachers, and non-participating teachers in regard to the Mathematics Achievement Program.

The results may be summarized collectively as follows: (1) One hundred per cent of the students considered it an honor to participate in the achievement program; (2) the program is definitely a stimulus for the participating students to put forth greater effort in their academic subjects; (3) contest participation has as its rewards for the student: self-satisfaction of accomplishment and a stimulus to seek higher education, actual scholarship awards, certificates of achievement to all who participate in the final contest and medals to the upper twenty-five per cent of the state winners; (4) a great majority of the teachers who participate feel the time used for the program has been well spent; (5) most teachers indicate that they do not have a direct desire to win but receive satisfaction through having their students participate; (6) small and large schools benefit in fair proportion; (7) teachers who do not participate still believe competition is a desirable type of stimulation; (8) dissatisfaction of non-participating teachers

arises to some extent from a limited concept of the program and results obtained in the contest, since these results and benefits are discovered by actual contest participation; (9) teachers who do not participate felt that the majority of students would be slighted for the benefit of a limited few; (10) there would be more contest entries if the program information reached the teachers; (11) 40 per cent of the non-participating schools do not encourage participation in contests other than athletics and music.

Conclusion. The achievement program needs more widespread publicity through the use of newspapers, poster, radio, and television to create a more general interest on the part of administration, teachers, and pupils. Non-participating schools should be encouraged to participate by county superintendents, who could receive additional information on benefits of the contest as gathered by various studies and pass the information on to school administrations to encourage both students and teacher.

Students enjoy participating in the contests and receive benefits such as enlarged concepts of educational values and motivation for higher education. More teachers would participate if they were not overburdened with a too great teaching load and with other assigned duties. A large number of teachers remain uninformed concerning the program, not through the fault of the contest center, but for unknown

reasons. Schools are not stressing high accomplishment in academic subjects sufficiently in comparison with accomplishment in music and athletics.

The students themselves do not seem to think the contest unfair to the same degree that the teachers do; therefore many students are deprived of the benefits of entering because of the teachers' personal feelings toward the contest.

Recommendation. For further study, it would seem interesting to find if participation in the first year algebra contest is an influence toward further mathematics study in high school.

Another point for study might be an investigation of contestants who have graduated from high school to find how many were influenced by the contest in their choice of occupations.

Since the results of this investigation indicate that the program is worthwhile for those who participate, thorough investigation into causes for the announcements not reaching the teachers would be welcome.

The difference in school size seemed to raise more questions and comment than any other one thing on the questionnaires. It might, therefore, be profitable to look into the possibilities for arranging contests according to the number of pupils enrolled in a school.

APPENDIX

Dear Student:

We are interested in bettering the State Mathematics Contest and feel that your help, as a previous participant, will be valuable. Your prompt cooperation will be greatly appreciated.

Circle the correct response.

1. Did you consider it an honor to participate in the State Contest? yes no

2. Was it worth the time you spent in preparation? yes no

3. Did participation in the contest help you see the value of scholastic achievement? yes no

4. Did your interest in the contest stimulate you to put forth greater effort in mathematics? yes no

5. Did preparation for the contest result in neglect of your other subjects? yes no

6. Did you receive special coaching or help from your instructor? yes no

7. Did you feel you were competing on an equal basis with other students in the contest? If not, why not? yes no

8. Have you received any honors in school such as in music, athletics, Latin, etc.? If the answer is yes, please list. yes no

9. Do you think the contest program can be improved? If so, tell how. yes no

NAME _____

SCHOOL _____

The Mathematics Achievement Program has been progressing for twenty years. You have been selected to give your reactions, in order that the program may be enlarged and improved. Your prompt cooperation is appreciated so the results may be announced at the spring meeting.

Circle the correct response.

1. How many years have you participated in the program? _____

2. Do you participate (1) every year, (2) only when you have outstanding students? 1 2

3. Is your motive (1) to give you a feeling of accomplishment, (2) desire to win? 1 2

4. Do you feel the time expended on your part is justified by the results you have obtained? yes no

5. Do you believe the program is an incentive for students to be more industrious? yes no

6. On what basis are your contestants selected? 1 2
(1) teacher judgment, (2) Preliminary examinations near beginning of year, (3) Preliminary examinations near contest date, (4) please name other _____ 3 4

7. How long before the regional contest, do you select contestants? _____

8. Do you feel the program warrants school time? yes no

9. Do you regularly receive announcements concerning the program? yes no

10. Does the school pay your enrollment fee? yes no

11. Is it the policy of your school to encourage participation in contests other than athletics and music? yes no

12. Do you believe small and large schools benefits in fair proportion? yes no

13. Circle the size of your school, (1) 1-250; (2) 251-500; (3) 501-1000; (4) 1001-2000; (5) 2001-3000; (6) over 3000.

14. List numbers of the following purposes in their order of importance: (1) professional improvement of the teacher, (2) comparison of student achievement, (3) identification of superior talent that should receive encouragement, (4) stimulation of better study habits, (5) enlargement of the students concepts of educational values. _____

15. Remarks: Use other side of the sheet, if necessary.

SCHOOL NAME _____

The State Mathematics Contest has been held for twenty years. As a program grows it should be evaluated for improvements. To obtain the reactions of teachers, you have been selected to answer the following questions and add any suggestions you might wish to make. Please take a few minutes to answer.

Circle the correct response. Where there is not enough space, feel free to write on the back of the page.

1. Do you participate in the program? yes no

2. Do you believe in rewarding academic achievement? yes no

3. Do you believe competition with others stimulates academic achievement? yes no

4. Do you believe this is the right kind of stimulation? yes no

5. If you do not participate in the contests, would you if they were conducted during school time? yes no

6. Do you feel this program interrupts your school program? yes no

7. Do you regularly receive announcements concerning this program? yes no

8. Is it the policy of your school to encourage participation in contests other than athletics or music? yes no

9. If the answer to number 7 is no, do you know why not? yes no Explain.

10. If you did not participate last year, what were your reasons? List. yes no

11. Circle the size of your school (Senior High) (1) 1-250; (2) 251-500; (3) 501-1000; (4) 1001-2000; (5) 2001-3000; (6) over 3000.

12. Do you have any ideas you wish to express on the contest? Please feel free to write them.

SCHOOL NAME _____