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Background and Academic Preparation Of the Mathematics Teachers in the Public High Schools of Kansas 1957-1958

By John M. Burger

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EMPORIA, KANSAS

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Background and Academic Preparation of the Mathematics Teachers in the Public High Schools of Kansas 1957-1958

By John M. Burger*

INTRODUCTION

A conference on Mathematics and Science Education in U.S. Public Schools was held in Washington, D.C., on February 10-11, 1958. It was sponsored by the American Association for the Advancement of Science, American Association of School Administrators, Council of Chief State School Officers, National Association of Secondary School Principals, and the Scientific Manpower Commission. In the official report on this conference, Circular 533, U.S. Department of Health, Education and Welfare, Mr. James R. Killian, Jr., Special Assistant to the President for Science and Technology, pointed out that quality is the important consideration in the development of scientists, and that superior students should be identified early in order that the high schools might instruct them properly. The high school teacher often is the person who stimulates the student to study a particular field.

Mr. Reuben G. Gustavson, President, Resources for the Future, Inc., remarked that college science departments often fail to consider the student's high school background. Students with a specific high school course are placed in the same class with those who did not have that high school course, and all are taught as if none had the high school preparation. Mr. M. H. Trytten, Director, Office of Scientific Personnel, National Academy of Science, discussed the Russian educational system, including the training of teachers. He stated that Russians preparing to become mathematics teachers are required to take courses in theory of numbers, complex variables, projective geometry, and mathematical analysis. He also stated that one question before the American people is whether we collectively want to meet the Russian challenge, not whether we can.

Mr. J. Darrell Bernard, Professor of Education, New York University, made remarks at the same conference which may apply to the situation in Kansas. He said, "Schools should consider the redeployment of their teachers for more effective science teaching. There have been instances where teachers with minors in mathematics or science have been left (available) to teach in this major field at a time when less qualified teachers were employed to "cover" the mathematics or science classes . . . Many of our very best science teachers have found that they must become administrators if they desire to go beyond the maximum of the salary sched-

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ule of their schools. The teaching services of many excellent science teachers have been lost in this way. When there is a critical shortage of good science teachers, this practice is questionable."

At the same Washington conference Mr. Howard F. Fehr, Professor of Mathematics, Teachers College, Columbia University, discussed the training of mathematics teachers, pointing to the fact that, "The College Entrance Examination Board Commission on Mathematics spent almost three years with mathematicians, educators, and teachers working out a program." It can be seen that this revision of the curriculum and course content in mathematics predates the hysteria period of the Russian "Sputnik."

Discussions of the quality of presentation of mathematics in our high schools frequently lead to vague generalities concerning inadequate preparation and lack of interest on the part of mathematics instructors.

The purposes of this study were (1) to investigate the academic preparation of the teachers of mathematics in the public high schools of Kansas; (2) to present data concerning their teaching background and teaching assignments; and (3) to compile certain information according to the college from which the teachers were graduated.

PREVIOUS STUDIES

Previous studies of a comparable nature made at Emporia are: Weldon N. Baker and Merle E. Brooks, "Background and Academic Preparation of the Teachers of Science in the High Schools of Kansas, 1955-56" and Harold V. Sare, "Background and Academic Preparation of the Social Science Teachers in the High Schools of Kansas, 1956-57." Other studies are in progress.

A questionnaire, circulated by the Research Division of the National Education Association in March, 1958, gave information on the national situation concerning mathematics and science. A preliminary report was published in the N.E.A. Research Bulletin, October, 1958. The complete report was received after this study had been completed and had been sent to the printer.

METHODS

The official records of 1,037 teachers of mathematics in the public high schools of Kansas during the academic year 1957-58 were studied. The data were compiled from the High School Principal's Organization Reports on file in the accreditation office of the State of Kansas Department of Public Instruction and from college transcripts of courses and grades, on file in the certification office of the Department of Public Instruction.

The principal's reports list degrees and advanced work for 1,037 mathematics teachers. Transcripts were found, as listed by the principals, for 962, or 92.8 per cent, of the 1,037 teachers. There were 13 individuals for whom no transcripts were available.

The records are complete except for (1) those teachers who hold a life certificate and need not keep their transcript records up to date; (2) those teachers who were teaching prior to the date after which records had to be filed with the Department of Public Instruction and who, consequently, have no transcript in Topeka, and (3) those teachers who hold a renewable certificate and usually feel no obligation to keep their records current until time of required renewal.

In an attempt to obtain complete data, in those cases where it was believed that additional information might be available, personal visits were made to the registration offices of the Kansas State Teachers College, Emporia; Kansas State Teachers College, Pittsburg; Fort Hays Kansas State College, Hays; Kansas State College, Manhattan; and the University of Kansas, Lawrence. Since these schools supplied almost one-half, 48.1 per cent, of the teachers, it was believed this information would improve the reliability of the data.

While it is possible that there are errors in some of the principal's reports, such errors, if they exist, are presumably minor ones and will not invalidate the data as a whole or general inferences drawn from the data. It is believed that the implied accuracy of the principals' reports and the high percentage of teachers for whom completed data, including transcripts, were available, provide an adequate basis for the following analyses.

GENERAL INFORMATION

In studying the number of teachers employed to teach mathematics in Kansas schools of a specified size and in relating this number to the total number of teachers of mathematics, it must be borne in mind that in smaller schools a teacher may teach in as many as three or more fields.

To obtain an accurate picture of teaching assignments of mathematics teachers in Kansas high schools, it appears helpful to consider these in statistical relation to school size.

Distribution of Teachers

A manuscript on file in the office of the Division of Teacher Education at Kansas State Teachers College of Emporia, written by Andy E. Clark, Jr., now Dean of Northwestern State College, Alva, Oklahoma, formerly of Kansas State Teachers College of Emporia, contains information concerning the distribution of all 6,311 teachers in the secondary schools of Kansas during the school year 1956-57 and of the 2,662 teachers who were graduated from Kansas high schools. This distribution is tabulated according to the size of the city and the enrollment of the school. Data for Tables I and II were taken from Clark's manuscript and are used with his permission.

The column headed "Teachers Supplied" in Tables I and II indicates those teachers who were graduated from Kansas high schools. No attempt was made to consider teachers from outside the state. The values in Table

TABLE I

**NUMBER OF PUBLIC HIGH SCHOOL TEACHERS EMPLOYED AND
NUMBER OF PUBLIC HIGH SCHOOL TEACHERS WHO WERE
GRADUATED FROM KANSAS HIGH SCHOOLS PRESENTED
ACCORDING TO THE SIZE OF TOWN OR CITY**

Size of town or city	Teachers Employed		Teachers Supplied*	
	Number (total 6311)	Per cent of 6311	Number (total 2662)	Per cent of 2662
1-500	1,850	29.3	626	23.5
501-1,000	954	15.1	351	13.2
1,001-1,500	558	8.8	202	7.6
1,501-2,000	252	4.0	150	5.6
2,001-2,500	338	5.3	193	7.3
2,501-5,000	739	11.7	277	10.4
5,001-10,000	204	3.2	151	5.7
10,001-25,000	661	10.5	456	17.1
25,001 and over	755	12.0	256	9.6

*Teachers who were graduated from Kansas High Schools

I should be compared with the values given in Table XIII which tabulates only mathematics teachers.

Twenty-nine per cent of the teachers teach in communities of 500 or less, as indicated in Table I. Of the 2,662 teachers who were graduated from Kansas high schools, 23.5 per cent were graduated from high schools in communities having populations of 500 or less. Examination of Table I

TABLE II

**NUMBER OF PUBLIC HIGH SCHOOL TEACHERS EMPLOYED AND
NUMBER OF PUBLIC HIGH SCHOOL TEACHERS WHO WERE
GRADUATED FROM KANSAS HIGH SCHOOLS PRESENTED
ACCORDING TO THE SCHOOL ENROLLMENT**

School Enrollment	Number of Schools (total 591)	Teachers Employed		Teachers Supplied*	
		Number (total 6311)	Per cent of 6311	Number (total 2662)	Per cent of 2662
1-24	29	182	2.9	40	1.5
25-49	157	696	11.0	265	10.0
50-74	121	820	13.0	309	11.6
75-99	66	411	6.5	211	7.9
100-199	118	1,424	22.5	618	23.2
200-299	30	529	8.4	224	8.4
300-499	27	639	10.1	245	9.2
500-999	31	793	12.6	479	18.0
1,000 and over	12	817	12.9	271	10.2

*Teachers who were graduated from Kansas High Schools

indicates that almost 37 per cent of the teachers came from communities with populations of 1,000 or less. In contrast to this situation, 10.5 per cent of the 6,311 teachers are teaching in cities of populations between 10,001 and 25,000, while 17.1 per cent of the 2,662 teachers who were graduated from Kansas high schools came from high schools in cities of this size.

Table II provides a comparison, according to school size, of the number of public high school teachers with the number of those teachers who were graduated from Kansas high schools. There were 591 public high schools in Kansas in 1957-58, 29 of which had enrollments of less than 25. These 29 schools employed 182 teachers or 2.9 per cent of the total. In comparison with this, we note that only 1.5 per cent of the 2,662 teachers who were graduated from Kansas high schools came from these small schools. Of the 591 high schools, 373 had enrollments of less than 100. These schools employed about one-third of all the teachers and accounted for 31 per cent of the teachers who were graduated from Kansas high schools.

TABLE III
NUMBER OF HIGH SCHOOL TEACHERS AND NUMBER OF
MATHEMATICS TEACHERS PRESENTED ACCORDING
TO SIZE OF CITY WHERE EMPLOYED

Size of town or city	Teachers Employed (6311)		Mathematics Teachers (1037)	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
1-500	29.3	29.3	36.5	36.5
501-1,000	15.1	44.4	13.5	50.0
1,001-1,500	8.8	53.2	5.8	55.8
1,501-2,000	4.0	57.2	3.8	59.6
2,001-2,500	5.3	62.5	3.4	63.0
2,501-5,000	11.7	74.2	7.5	70.5
5,001-10,000	3.2	77.4	4.2	74.6
10,001-25,000	10.5	87.9	9.6	85.2
25,001 and over	12.0	100.0	15.9	100.0

The ratio of the number of high school mathematics teachers to the number of all high school teachers is fairly uniform, regardless of the size of the community. This is brought out in Table III. The differences are most pronounced in the very small towns, although there may be some significant differences in the ratios associated with larger communities. Twenty-nine per cent of all teachers in high schools teach in communities with populations of 500 or less, while 36.5 per cent of the teachers of mathematics are located in communities of this size. Forty-four per cent of all teachers and 50.0 per cent of the mathematics teachers are employed in communities with populations of 1,000 or less.

TABLE IV
NUMBER OF HIGH SCHOOL TEACHERS AND NUMBER OF
MATHEMATICS TEACHERS PRESENTED ACCORDING
SCHOOL ENROLLMENT WHERE EMPLOYED

School Enrollment	Total Teachers Employed (6311)		Mathematics Teachers (1037)	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
1-24	2.9	2.9	3.0	3.0
25-49	11.0	13.9	18.1	21.1
50-74	13.0	26.9	14.3	35.4
75-99	6.5	33.4	7.8	43.2
100-199	22.5	55.9	20.6	63.8
200-299	8.4	64.3	9.4	73.2
300-499	10.1	74.4	10.7	83.9
500-999	12.6	87.0	9.0	92.9
1000 and over	12.9	100.0	7.2	100.0

Table IV points out that there is a definite relation between school size and the ratio of the number of mathematics teachers to the total number of teachers. Thirteen and nine-tenths per cent of all teachers are employed in schools with enrollments up to 49, while 21.1 per cent of the mathematics teachers are so employed. Thirty-three and four-tenths per cent of all teachers and 43.2 per cent of the mathematics teachers are employed in schools of less than 100 enrollment.

TABLE V
CLASS OF SCHOOL IN WHICH THE MATHEMATICS
TEACHERS WERE EMPLOYED

Class of School	Number of Schools (591)	Teachers of One Math. Class (236)	Teachers of Two or More Math. Classes* (410)	Full Time Math. Teachers (391)	Total (1037)	Per cent	Cumulative Per cent
A	303	99	226	367	692	66.8	66.8
B	128	51	87	17	155	15.0	81.8
C	136	73	84	7	164	15.8	97.6
M	23	13	12		25	2.3	99.9
Prov.	1		1		1	0.1	100.0

*The teacher teaches two or more sections of mathematics, but devotes at least one period, usually more, to teaching some other field or to administration.

During the period, 1957-58, concerned by this report, Kansas high schools were classified A, B, C, M and Provisional, in accordance with standards set by the Kansas Department of Public Instruction and stated in the "Certificate Handbook," issued March 1, 1955. The standards take into account such criteria as size, excellence of administration, effectiveness of school programs, and excellence of relationship between faculty, students, board of education and the community. Table V indicates that 303 of the 591 schools met the standards for Class A.

Six hundred ninety-two, or 66.8 per cent, of the mathematics teachers were employed in the 303 Class A schools. One hundred fifty-five, or 15.0 per cent, were employed in Class B schools; 164, or 15.8 per cent, in Class C schools; and the remaining 26, or 2.4 per cent, in Class M or Provisional schools.

In Table V and in some of the tables which follow, teachers are listed as teachers of one mathematics class, teachers of two or more mathematics classes, and full-time mathematics teachers. A teacher of one mathematics class teaches only one section of mathematics, devoting the remainder of his schedule to other duties. A teacher of two or more mathematics classes devotes at least one period, usually more, to teaching classes in some other field, or to administration. Full-time mathematics teachers devote their full teaching time to mathematics. In a few school systems these individuals have a study hall, but in no case are they administrators or teachers in another field. It was thought, in the planning of the investigation, that

TABLE VI
DISTRIBUTION OF MATHEMATICS TEACHING LOADS
ACCORDING TO SCHOOL SIZE

School Enrollment	Teachers of One Math. Class	Teachers of Two or More Math. Classes*	Full Time Math. Teachers	Total	Per cent	Cumulative Per cent
	(236)	(410)	(391)	(1037)		
1-24	18	11	2	31	3.0	3.0
25-49	87	96	5	188	18.1	21.1
50-74	38	99	11	148	14.3	35.4
75-99	15	51	15	81	7.8	43.2
100-199	44	76	93	213	20.6	63.8
200-299	12	20	65	97	9.4	73.2
300-499	15	30	66	111	10.7	83.9
500-999	6	22	65	93	9.0	92.8
1000 and over	1	5	69	75	7.2	100.0

*and devote at least one period to some other field or administration

there might be noticeable differences in preparations and other characteristics among these three groups.

Table VI gives the distribution of mathematics teaching loads according to school size. This table shows the large number of part-time mathematics teachers in the small schools. Eighteen of 31 mathematics teachers in schools with enrollments of less than 25 teach only a single section of mathematics. Since there are twenty-nine of these schools, as indicated in Table II, it may be seen that only one mathematics course was offered during 1957-58 in at least 16 of these schools. It was found that there are only 7 of the single-section teachers in schools with enrollments of 500 or more, and 27 part-time and 134 full-time mathematics teachers in these same schools.

TABLE VII
POPULATION OF THE CITY IN WHICH THE MATHEMATICS
TEACHERS WERE EMPLOYED

Population of Town or City	Teachers of One Math. Class	Teachers of Two or More Math. Classes*	Full Time Math. Teachers	Total	Per cent	Cumulative Per cent
	(236)	(410)	(391)	(1037)		
1-500	139	212	27	378	36.5	36.5
501-1,000	37	72	31	140	13.5	50.0
1,001-1,500	12	28	20	60	5.8	55.8
1,501-2,000	9	15	15	39	3.8	59.6
2,001-2,500	7	10	18	35	3.4	63.0
2,501-5,000	15	27	36	78	7.5	70.5
5,001-10,000	4	7	32	43	4.2	74.6
10,001-25,000	6	23	70	99	9.6	85.2
25,001 and over	7	16	142	165	15.9	100.0

*and devote at least one period to some other field or administration

Table VII gives the distribution of mathematics teaching loads according to the size of the town or city in which the school is located. Since the size of the school corresponds roughly to the size of the community, it is not surprising that Tables VI and VII show marked consistencies. Thus, more than one-half, 139 of 236, of the single-section teachers are employed in communities with populations not exceeding 500. It will be recalled, from Table VI, that 143 of 236 single-section teachers were in high schools with enrollments below 75. Similarly, 212 of 410 part-time mathematics teachers are in these same small communities, while, from Table VI, 206 of these 410 teachers are in high schools with enrollments below 75. Also

there are only a few, 27 of 391, full-time mathematics teachers in communities with populations not exceeding 500, and there are only 18 of these 391 full-time teachers in schools with enrollments below 75.

TABLE VIII
ADMINISTRATIVE ORGANIZATION OF THE SCHOOLS IN WHICH
THE MATHEMATICS TEACHERS WERE EMPLOYED

Organization Plan	Number of Schools (591)	Teachers of One Math. Class (236)	Teachers of Two or More Math. Classes*	Full Time Math. Teachers (391)	Total (1037)	Per cent
8-4	496	202	332	133	667	64.4
6-0	57	8	34	36	78	7.5
6-3-3	16	11	19	157	187	17.7
6-3-3-2	11	5	11	40	56	5.4
6-2-4	7	9	12	9	30	2.9
6-4-4	3	1	2	13	16	1.5
5-3-4	1			3	3	0.3

*and devote at least one period to some other field or administration

Table VIII shows that most of the high schools in Kansas, 496 of 591, are organized on the 8-4 plan. These schools employ almost all, 202 of 236, of those teaching only one section of mathematics. These schools also employ most, 332 of 410, of the part-time mathematics teachers, and one-third, 133 of 391, of the full-time mathematics teachers. The plan followed in the largest cities is the 6-3-3 plan. The schools using this plan employ few one-section and part-time teachers, 11 and 19 respectively, but many, 157 of 391, of the full-time teachers of mathematics.

Duties of Part-time Mathematics Teachers

The teacher spending less than full time teaching mathematics has other assigned duties. Many of them, 415 of 646, have duties which take a larger portion of their time than their mathematics teaching or other activities. See Table IX. These 415 teachers comprise 40 per cent of all teachers of mathematics. This suggests that possibly 60 per cent of the teachers of mathematics have mathematics as their principal field of interest.

Table IX shows that school administration is the principal field of interest for 113, or 27.3 per cent, of the 415 teachers who devote less than full time to mathematics. For 109 teachers, or 26.3 per cent, the principal field is science, so that over one-fourth of the 415 have their first interest

TABLE IX**NUMBER OF MATHEMATICS TEACHERS DEVOTING MORE TIME TO INDICATED NON-MATHEMATICS DUTY THAN TO MATHEMATICS**

Duty	Teachers by Number of Classes of Math.			Total Teachers (415)	Per cent of 415
	One Class (229)	Two Classes (175)	Three Classes (11)		
Administration	59	44	10	113	27.3
Science	44	65		109	26.3
Business	22	15		37	8.9
Physical Education	18	14	1	33	8.0
English and Speech	17	7		24	5.8
Social Science	17	6		23	5.5
Industrial Arts	16	7		23	5.5
Music	10	2		12	2.9
Vocational Agriculture	8	2		10	2.4
Home Economics	6	3		9	2.2
Driver Training	3	5		8	1.9
Coaching	2	1		3	0.7
Language	1	1		2	0.5
Others	6	3		9	2.2

in a field which usually requires preparation in mathematics equivalent to a minor in mathematics. Of the 236 single-section mathematics teachers, 7 have daily schedules covering as many fields as they have classes.

Age and Experience

The teachers of mathematics are a young group. Of the 1,037 mathematics teachers in Kansas, 415 are less than 36 years of age. Five hundred thirty-six, or 51.7 per cent, have had less than 11 years experience. They move about considerably. Six hundred eighty-five, or 66.1 per cent, have been in their present position less than 6 years. Further details concerning these phases of information are given in Tables X, XI, and XII.

TABLE X**AGE OF MATHEMATICS TEACHERS**

Age	Number (Total 1037)	Per cent of 1037	Cumulative Per cent
20-25	83	8.0	8.0
26-30	148	14.3	22.3
31-35	184	17.7	40.0
36-40	115	11.1	51.1
41-45	75	7.2	58.3
46-50	112	10.8	69.1
51-55	122	11.8	80.9
56-60	88	8.5	89.4
Above 60	105	10.1	99.5
Unknown	5	0.5	100.0

TABLE XI
TOTAL YEARS TEACHING EXPERIENCE OF
MATHEMATICS TEACHERS

Number of Years	No. of Teachers (total 1037)	Per cent of 1037	Cumulative Per cent
1-5	291	28.1	28.1
6-10	245	23.6	51.7
11-15	94	9.1	60.8
16-20	95	9.2	69.9
21-25	95	9.2	79.1
26-30	81	7.8	86.9
31-35	75	7.2	94.1
36-40	35	3.4	97.5
Over 40	26	2.5	100.0

TABLE XII
YEARS OF TEACHING EXPERIENCE OF MATHEMATICS TEACHERS
IN CURRENT SCHOOL

Number of Years	Number of Teachers (total 1037)	Per cent of 1037	Cumulative Per cent
1-5	685	66.1	66.1
6-10	143	13.8	79.8
11-15	99	9.5	89.4
16-20	37	3.6	93.0
21-25	26	2.5	95.5
26-30	20	1.9	97.4
31-35	17	1.6	99.0
36-40	7	0.7	99.7
Over 40	3	0.3	100.0

Source of Teachers

The majority of the mathematics teachers in Kansas, 68.1 per cent of 1,037, were graduated from Kansas high schools. Table XIII gives a compilation of the number of teachers by the size of the city in which the high schools were located from which the teachers were graduated. Fifty-two per cent of the mathematics teachers who graduated from Kansas high schools came from cities of 2,000 or less population.

Salary

During the year 1957-58, the average annual salary for all high school teachers was \$4,344, according to a report by the Kansas State Teachers Association, Department of Professional Relations, December 1, 1958. This is very near the average annual salary of \$4,386 for all mathematics

teachers. As indicated by Table XIV, the salaries received by the teachers of mathematics ranged from below \$2,500 to over \$6,000. The average annual salaries are \$4,375 for teachers of only one mathematics class, \$4,255 for teachers of more than one class but less than full time, and \$4,529 for full-time teachers of mathematics.

TABLE XIII
SIZE OF CITY IN WHICH HIGH SCHOOL WAS LOCATED FROM WHICH THE KANSAS HIGH SCHOOL-EDUCATED MATHEMATICS TEACHER WAS GRADUATED

Size of City or Town	Number of Teachers (total 706)	Per cent of 706	Cumulative per cent
1-500	206	29.2	29.2
501-1,000	85	12.0	41.2
1,001-1,500	51	7.3	48.4
1,501-2,000	27	3.8	52.3
2,001-2,500	43	6.1	58.4
2,501-5,000	68	9.6	68.0
5,001-10,000	43	6.1	74.1
10,001-15,000	61	8.6	82.7
15,001- and over	122	17.3	100.0

TABLE XIV
ANNUAL SALARIES OF THE MATHEMATICS TEACHERS IN KANSAS PUBLIC HIGH SCHOOLS 1957-1958

Annual Salary (in dollars)	Teachers of One Math. Class (236)	Teachers of Two or More Math. Classes* (410)	Full Time Math. Teachers (391)	Total (1037)	Per cent	Cumulative Per cent
Under 2,501	6	3	1	10	1.0	1.0
2,501-3,000	2	4		6	0.6	1.5
3,001-3,500	9	15	10	34	3.3	4.8
3,501-4,000	75	144	96	315	30.4	35.2
4,001-4,500	37	113	97	247	23.8	59.0
4,501-5,000	53	79	91	223	21.5	80.5
5,001-5,500	30	31	59	120	11.6	92.1
5,501-6,000	11	15	19	45	4.3	96.4
Over 6,000	9	4	18	31	3.0	99.4
Unkown	4	2		6	0.6	100.0
Average	\$4,375	\$4,255	\$4,529	\$4,386		

*and devote at least one period to some other field or administration

Teaching Assignments in Mathematics

In 115 schools having less than a full day's schedule of mathematics sections, the mathematics courses are taught by more than one teacher. In 34 of these 115 schools each section was taught by a different instructor. Could this practice possibly account for the often repeated remarks concerning unqualified and uninterested teachers?

TABLE XV
MATHEMATICS SUBJECTS TAUGHT BY THE
MATHEMATICS TEACHERS

Subject	Only Mathematics Subject Taught No. of Teachers	Subject Taught in Combination with other Mathematics Subjects No. of Teachers	Total Teachers of Subject
First Year Algebra	136	556	692
Plane Geometry	54	407	461
General Mathematics	114	294	408
Second Year Algebra	21	258	279
Trigonometry	1	78	79
Solid Geometry		71	71

In Table XV, the courses in mathematics are ranked by the number of teachers involved in teaching the course. First year algebra is taught by 692 teachers, plane geometry by 461 teachers, and general mathematics by 408 teachers. The number of teachers of second year algebra was less than half the number of teachers of first year algebra, and the number of teachers of trigonometry or solid geometry was little more than one-tenth of the number of first-year algebra teachers.

In addition to the courses listed in Table XV, some schools offer courses in business arithmetic, shop mathematics, consumer mathematics, and junior high mathematics. These, if taught by a teacher teaching some other mathematics courses, were classed as "lower" in compiling this report. Some schools offer courses designated senior mathematics, college algebra, or higher mathematics. When these were indicated as of the twelfth year level on the principal's report, they were classed as "higher" in compiling this report.

Table XVI lists the mathematics course combinations taught by mathematics teachers in Kansas public high schools during the academic year 1957-58.

TABLE XVI

**MATHEMATICS COURSE COMBINATIONS TAUGHT BY TEACHERS
IN KANSAS PUBLIC HIGH SCHOOLS 1957-1958**

Mathematics Courses	No. of Teachers Teaching		Total Teachers of 1037	Per cent
	One section	More than one		
One Course			326	31.4
First Year Algebra	102	34	136	
General Mathematics	77	37	114	
Plane Geometry	39	15	54	
Second Year Algebra	17	4	21	
Trigonometry	1		1	
Two Course Combinations			396	38.2
Gen. Math. and First Year Algebra	28	59	87	
Gen. Math. and Lower Mathematics	3	35	38	
Gen. Math. and Plane Geometry	9	9	18	
Gen. Math. and One Other	2	2	4	
First Year Algebra and Plane Geometry	86	43	129	
First Year Algebra and Sec. Yr. Algebra	30	10	40	
First Year Algebra and One Other	6	25	31	
Second Year Algebra and Pl. Geometry	8	13	21	
Other Two Course Combinations	15	13	28	
Three Course Combinations			214	20.6
Gen. Math., First Yr. Alg., and Pl. Geom.	27	12	39	
Gen. Math., First Yr. Alg., & One Other	18	21	39	
Gen. Math. and Two Others	4	6	10	
First Yr. Alg., Sec. Yr. Alg., & Pl. Geom.	34	27	61	
First Yr. Alg., Pl. Geom., and One Other	15	12	27	
First Year Algebra and Two Others	14	7	21	
Other Three Course Combinations	4	13	17	
Four Course Combinations			78	7.5
Gen. Math., First Yr. Algebra, Sec. Yr. Algebra, and Pl. Geometry	13	14	27	
Gen. Mathematics and Three Others	12	5	17	
First Year Algebra and Three Others	11	10	21	
Other Four Course Combinations	2	11	13	
Five Course Combinations			21	2.0
	9	12		
Six Course Combinations			2	0.2
	1	1		

ACADEMIC PREPARATION

Source of Degrees

As shown by Table XVII, 785 of the 1,037 Kansas mathematics teachers received their baccalaureate degrees from Kansas colleges. Of these, 499, or 48.1 per cent, received the degree from the five state colleges; 226, or 21.8 per cent, from independent Kansas colleges; and 60, or 5.8 per cent, from the two Kansas municipal universities. The 191, or 18.4 per cent, from surrounding states contribute most of the remainder, only 60, or 5.8 per cent, being from other states.

TABLE XVII
SOURCE OF BACCALAUREATE DEGREE

College or University	No. of Teachers	Total for Each Group
KANSAS STATE COLLEGES AND UNIVERSITY		499
Kansas State Teachers College of Pittsburg	128	
Kansas State Teachers College of Emporia	112	
Fort Hays Kansas State College	95	
Kansas State College	93	
The University of Kansas	71	
KANSAS INDEPENDENT COLLEGES AND UNIVERSITIES		226
Southwestern College	38	
Bethel College	35	
Ottawa University	26	
McPherson College	25	
Kansas Wesleyan College	21	
Baker University	17	
Bethany College	16	
Friends University	16	
Sterling College	12	
College of Emporia	7	
Marymount College	6	
Mount St. Scholastica College 2	5	
St. Benedict's College	2	
KANSAS MUNICIPAL UNIVERSITIES		60
Washburn University	36	
Wichita University	24	
OKLAHOMA COLLEGES AND UNIVERSITIES		108
State Teachers Colleges	77	
Other State Colleges and Universities	24	
Independent Colleges	7	
MISSOURI COLLEGES AND UNIVERSITIES		56
State Teachers Colleges	39	
Other State Colleges and Universities	6	
Independent Colleges	11	
OTHER COLLEGES		87
Nebraska Colleges	14	
Colorado Colleges	13	
Arkansas Colleges	11	
All Others	49	
No Record of Degree		1

A comparison of the 785 teachers who were graduated from Kansas colleges with the 706 teachers who were graduated from Kansas high schools, as indicated in Table XIII, indicates a possible movement of students into Kansas for college work. Fifty-three per cent of the teachers of mathematics in Kansas have received their bachelor's degree within the past fifteen years, as is shown by Table XVIII.

An increasing number of Kansas high school teachers have master's degrees. The sources of these degrees are given in Table XIX. Of the 1,037 Kansas mathematics teachers, 410, or 39.5 per cent, have received master's degrees. Of these degrees, 272, or 66.3 per cent, were issued by Kansas

TABLE XIX
SOURCE OF MASTER'S DEGREE

Name of College or University	Number of Teachers (410)	Per cent of 410
Kansas State Teachers College of Pittsburg	66	16.1
Kansas State Teachers College of Emporia	62	15.1
University of Kansas	53	12.9
Kansas State College	41	10.0
Fort Hays Kansas State College	37	9.0
Colorado State College of Education	25	6.1
Columbia University	16	3.9
University of Colorado	14	3.4
Wichita Municipal University	13	3.2
All Oklahoma Colleges and Universities	29	7.1
All Missouri Colleges and Universities	22	5.4
All Other Colleges and Universities	32	7.6

TABLE XX
LENGTH OF TIME (IN YEARS)
SINCE TEACHERS RECEIVED MASTER'S DEGREE
(as of 1958)

No. of Years	No. of Teachers (410)	Per cent of 410	Cumulative Per cent
1-5	133	32.4	32.4
6-10	96	23.4	55.9
11-15	42	10.2	66.1
16-20	67	16.3	82.4
21-25	43	10.5	92.9
26-30	20	4.9	97.8
31-35	7	1.7	99.5
36-40	1	0.2	99.8
41-45	1	0.2	100.0

colleges. As is seen in Table XX, 229 of the teachers who hold master's degrees, or 55.9 per cent, have received these degrees within the past ten years.

Academic Majors

About one-third of the mathematics teachers had a major in mathematics, and a majority had a major in either mathematics or science. The other mathematics teachers had majors, listed in Table XXI in their order of frequency, in the following areas: social science, physical education, business, industrial arts, home economics and agriculture, education, English and speech. The academic majors were determined, wherever possible, from the transcript data. Some of these people had a second major. If either major was mathematics, the person was classified as a mathematics major.

No attempt was made, in this table to measure the quality or quantity of the major. Twenty-four hours in a field was accepted as a major if the degree did not specify the major. This corresponds to a "teaching field" requirement. As would be expected, those teachers teaching a single mathematics section are less likely to have a major in mathematics, as they usually teach in at least three fields. This is shown by Table XXI. Of the 339 teachers with mathematics majors, 9.7 per cent are teachers of a single mathematics class, 33.9 per cent are part-time mathematics teachers, and 56.4 per cent are full-time teachers.

Information was obtained on the majors and ages of 1,012 mathematics teachers. This information is presented in Table XXII. Analysis of the data indicates fluctuations above and below the overall average of 33.4 per cent mathematics majors. The number of physical education majors between ages of 21 and 40 seems to indicate an increase in the number of teachers with a combination of mathematics and physical education training, while the number of social science majors between ages of 21 and 40 seems to indicate a decrease in the number of teachers with a combination of mathematics and social science.

For 337 of the 410 recipients of the master's degrees sufficient information was available to classify the degrees by fields. Table XXIII shows that 42, or 12.5 per cent, have a graduate major in mathematics. The 73 records which were incomplete belonged to persons reported by their principal as having a master's degree, but without master's degree transcripts in their file.

College Grades of Mathematics Teachers

It would be expected that full-time mathematics teachers generally have higher grades in college than those who are part-time teachers of mathematics. This expectation is borne out by the data of Table XXIV, which presents the distribution of the average grades of teachers. The teachers of mathematics include 64, or 6.2 per cent, whose college grades

TABLE XXI
ACADEMIC MAJOR FOR BACCALAUREATE DEGREE

Majors	Teachers of One Mathematics Class		Teachers of Two or More Mathematics Classes*		Full Time Mathematics Teachers		Total Number (1037) Per cent of 1037	
	Number (236)	Per cent	Number (410)	Per cent	Number (391)	Per cent		
Mathematics	33	14.0	115	28.0	191	48.8	339	32.7
Science	41	17.4	99	24.1	53	13.6	193	18.6
Social Science	35	14.9	34	8.3	29	7.4	98	9.5
Physical Education	27	11.5	40	9.8	30	7.7	97	9.4
Business	23	9.8	19	4.6	13	3.3	55	5.3
Industrial Arts	22	9.3	23	5.6	8	2.0	53	5.1
Home Econ. and Agric.	12	5.1	20	4.9	12	3.1	44	4.2
Education	13	5.5	10	2.4	14	3.6	37	3.6
English and Speech	7	3.0	15	3.7	13	3.3	35	3.4
Other	19	8.1	25	6.1	19	4.9	63	6.1
None or Unknown	4	1.7	10	2.4	9	2.3	23	2.2

*and devote at least one period to some other field or a administration

TABLE XXII
ACADEMIC MAJORS OF MATHEMATICS TEACHERS BY AGE

Age	Mathematics	Science	Social Science	Phys. Educ.	Business	Ind. Arts	Home Ec. Agric.	Education	English Speech	Other
21-25	32	18	2	7	9	5	4	0	3	2
As per cent of 82	39.0	22.0	2.4	8.5	11.0	6.1	4.9	0.0	3.7	2.4
26-30	44	31	13	34	7	12	2	2	0	3
As per cent of 148	27.7	20.9	8.8	23.0	4.7	8.1	1.4	1.4	0.0	2.0
31-35	63	32	12	35	7	10	5	4	1	13
As per cent of 182	34.2	17.4	6.5	19.0	3.8	5.4	2.7	2.2	0.5	7.1
36-40	38	24	10	12	7	12	3	2	2	4
As per cent of 114	33.3	21.1	8.8	10.5	6.1	10.5	2.6	1.8	1.8	3.5
41-45	19	11	11	2	8	4	6	4	3	5
As per cent of 73	26.0	15.1	15.1	2.7	11.0	5.5	8.2	5.5	4.1	6.8
46-50	36	26	11	3	9	2	3	5	7	6
As per cent of 108	33.3	24.1	10.2	2.8	8.3	1.9	2.8	4.6	6.5	5.6
51-55	42	26	16	2	2	5	8	4	3	12
As per cent of 120	35.0	21.7	13.3	1.7	1.7	4.2	6.7	3.3	2.0	10.0
56-60	40	9	10	1	4	2	5	5	4	3
As per cent of 79	50.6	11.4	12.7	1.3	5.1	2.5	6.3	6.3	5.1	3.8
Over 60	24	16	12	1	2	1	8	11	12	15
As per cent of 101	23.8	15.9	11.9	1.0	2.0	1.0	7.9	10.9	11.9	14.9
All Ages	338	193	97	97	55	53	44	37	35	63
As per cent of 1012	33.4	19.1	9.6	9.6	5.4	5.2	4.3	3.7	3.5	6.2

TABLE XXIII
ACADEMIC MAJOR FOR MASTER'S DEGREE

College or University	Number	Per cent of 63	Education	Mathematics	Science	Social Science	Ind. Arts	Phys. Educ.	Home Ec. Agrl.	English Speech	Business	Other
K.S.T.C. Pittsburg	39	61.9	2	7	2	3.2	0	0	0	0	0	1
			3.2	11.1	3.2	0.0	0.0	0.0	0.0	0.0	0.0	1.6
K.S.T.C. Emporia	37	60.7	3	0	2	3.3	2	2	1	2	0	4
			4.9	0.0	3.3	3.3	3.3	1.6	1.6	3.3	0.0	6.5
University of Kansas	37	77.1	1	0	1	2.1	2	0	0	1	0	0
			2.1	0.0	2.1	4.2	4.2	0.0	0.0	2.1	0.0	0.0
Kansas State College	28	68.3	5	0	0	0.0	1	2	2	0	1	0
			12.2	0.0	0.0	2.4	2.4	4.9	4.9	0.0	2.4	0.0
Fort Hays Kansas State College	22	62.9	3	1	1	2.9	0	0	0	0	2	0
			8.6	2.9	2.9	0.0	0.0	0.0	0.0	0.0	5.7	0.0
Other State Colleges	26	70.3	2	1	3	8.1	2	2	2	0	0	1
			5.4	2.7	8.1	5.4	5.4	5.4	5.4	0.0	0.0	2.7
Independent Colleges	29	87.9	0	0	0	0.0	0	0	0	1	0	0
			0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
Other State Teachers Colleges	16	84.2	0	1	0	0.0	0	0	0	0	0	0
			0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Colleges	234	69.4	16	10	9	2.7	7	5	5	4	3	7
			4.7	3.0	2.7	2.1	2.1	1.5	1.5	1.2	0.9	2.1

were so low that they succeeded in graduating only by completing more hours than usually required or by repeating courses already taken. One individual completed 187 hours of college work while receiving 134 grade points (1 point for C) and graduated. However, most of the teachers, 559, or 53.9 per cent, have averaged grades of B or better.

College Credit in Mathematics

College credit in mathematics is an important criterion for adequacy of preparation for teaching mathematics. Table XXV gives the distribution of college credit hours in mathematics for all teachers for whom this data was obtainable. This table shows that 62.3 per cent of the one-class teachers had only 16 hours, or less, of mathematics. Of the part-time teachers, 41.0 per cent had at most 16 hours, and 34.7 per cent had at least 25 hours. Of the full-time mathematics teachers, 22.3 per cent had at most 16 hours, while 56.0 per cent had at least 25 hours of mathematics.

TABLE XXIV
GRADES OF TEACHERS OF MATHEMATICS

Teaching Load in Mathematics		Average Grades of Teachers						Not avail.	Total
		A	A-B	B	B-C	C	C—		
One Mathematics Class	Number	5	10	90	32	76	18	5	236
	Per cent	2.1	4.2	38.1	13.6	32.2	7.6	2.1	
	Cumulative Per cent	2.1	6.4	44.5	58.1	90.3	97.9	100.0	
Two or more classes but not full time	Number	14	23	179	38	117	31	8	410
	Per cent	3.4	5.6	43.7	9.3	28.5	7.6	2.0	
	Cumulative Per cent	3.4	9.0	52.7	72.0	90.5	98.0	100.0	
Full Time	Number	20	35	183	49	83	15	6	391
	Per cent	5.1	9.0	46.8	12.5	21.2	3.8	1.5	
	Cumulative Per cent	5.1	14.1	60.9	73.4	94.6	98.5	100.0	
All Mathematics Teachers	Number	39	68	452	119	276	64	19	1037
	Per cent	3.8	6.6	43.6	11.5	26.6	6.2	1.8	
	Cumulative Per cent	3.8	10.3	53.9	65.4	92.0	98.2	100.0	

There are twenty-one teachers whose transcripts show no mathematics credit. The principal's report states that these people are qualified to teach mathematics. This discrepancy points to the major source of error in a report of academic training of teachers: the academic record is not current in Topeka. This situation will be improved with time, as more teachers obtain renewable certificates. Many people holding life certificates do not transmit to the certification office information to keep records current. Seventeen of the teachers did not have records at any of the locations where records were studied.

QUALIFICATIONS FOR TEACHING

Most teachers meet requirements for the class of school in which they are located. As shown in Table XXVI, of the teachers in Class A schools, 88.0 per cent meet the Class A requirements, 15 hours of college mathematics or its equivalent as listed in the 1955 Certificate Handbook.

To find whether qualifications are closely related to age, the records of 1,018 teachers were studied, the data being tabulated in Table XXVII. The teachers in the age groups up to 35 years are slightly better qualified

TABLE XXVI

TEACHERS MEETING CURRENT REQUIREMENTS FOR TEACHING
IN CLASS OF SCHOOL WHERE EMPLOYED

Class	Meet Qualifications	Do not meet Qualifications	No Transcript
CLASS A			
Teachers of 1 Math. Class	79	18	2
Teachers of 2 or more Math. Classes and teach in some other field or administration	187	34	5
Full time Math. Teachers	343	20	4
Total	609	72	11
Per cent of 692	88.0	10.4	1.6
CLASS B			
Teachers of 1 Math. Class	41	10	
Teachers of 2 or more Math. Classes and teach in some other field or administration	74	11	2
Full time Math. Teachers	16	1	
Total	131	22	2
Per cent of 155	84.5	14.2	1.3
CLASS C			
Teachers of 1 Math. Class	65	19	2
Teachers of 2 or more Math. Classes and teach in some other field or administration	86	9	2
Full time Math. Teachers	7		
Total	158	28	4
Per cent of 190	83.2	14.7	2.1

than the overall average. They constitute 414, or 40.7 per cent, of the 1,018 teachers considered in this analysis.

TABLE XXVII
RELATIONSHIP BETWEEN AGE AND QUALIFICATION BY
CURRENT REQUIREMENTS TO TEACH IN SCHOOL
WHERE EMPLOYED

Age	Qualified		Not Qualified		Total (1018)
	Number (897)	Per cent (88.1)	Number (121)	Per cent (11.9)	
21-25	77	92.8	6	7.2	83
26-30	131	88.5	17	11.5	148
31-35	165	90.2	18	9.8	183
36-40	96	85.0	17	15.0	113
41-45	64	87.7	9	12.3	73
46-50	98	88.3	13	11.7	111
51-55	107	88.4	14	11.6	121
56-60	74	88.1	10	11.9	84
61 and over	85	83.3	17	16.7	102

Table XXVIII presents the college mathematics preparation of all teachers of mathematics in terms of qualifications to teach in the schools of various classes. Thus 68.5 per cent of the teachers meet Class A requirements, 15 hours, without using high school credits, while an additional 15.0 per cent could meet Class A requirements if they counted up to 3 years of high school mathematics. For Class A schools, the minimum number of college hours is 9, which must be supplemented by 3 units of high school mathematics. The Class B requirements, 12 college hours, are met by 76.6 per cent of the teachers without counting high school credits, while an additional 15.1 per cent could meet the requirements with up to 3 units of high school mathematics. For a Class B school, the minimum number of college hours is 6, which must be supplemented by 3 years of high school mathematics. Class C requirements, 8 college hours, are met, without counting high school credits, by 88.3 per cent of all teachers, and an additional 3.5 per cent could meet the requirements by counting one unit of high school mathematics. The minimum number of college hours of mathematics is 6.

Of the 236 single-class teachers, 112, or 47.5 per cent, have 15 or more hours of mathematics; of the 410 part-time teachers, 271, or 66.1 per cent, have 15 or more hours; and of the 391 full-time teachers, 327, or 83.7 per cent, have 15 or more hours of mathematics. Therefore, 710, or 68.5 per cent of 1,037 teachers of mathematics now meet the fifteen hour requirement.

TABLE XXVIII
PREPARATION IN MATHEMATICS OF TEACHERS OF MATHEMATICS
IN THE PUBLIC HIGH SCHOOLS OF KANSAS

Teaching Load in Mathematics	Total Semester Hours in Mathematics							no transcript	
	5 or less	6-7	8	9-11	12	13-14	15 over 15		
One Mathematics Class	33	14	21	28	10	14	12	100	4
Number									
Per cent of 236	14.0	5.9	8.9	11.9	4.2	5.9	5.1	42.4	1.7
Two or More Classes but not Full Time	28	17	21	29	18	17	16	255	9
Number									
Per cent of 410	6.8	4.1	5.1	7.1	4.4	4.1	3.9	62.2	2.2
Full Time	7	6	8	13	10	16	21	306	4
Number									
Per cent of 391	1.8	1.5	2.0	3.3	2.6	4.1	5.4	78.3	1.0
All Teachers	68	37	50	70	38	47	49	661	17
Number									
Per cent of 1037	6.6	3.6	4.8	6.8	3.7	4.5	4.7	63.7	1.6
Cumulative per cent of 1037	6.6	10.1	14.9	21.7	25.4	29.9	34.6	98.4	100.0

It has been possible, in the past, for a person to teach mathematics with a minimum of 6 hours of college mathematics. A number of teachers have entered teaching under such regulations and continue to teach. If the six hour minimum is used, as a test, Table XXVIII shows that 33 teachers of one mathematics class each, 28 teachers who teach two or more mathematics classes each, and 7 full-time mathematics teachers do not meet the basic minimum which has been in effect for a number of years. Some of these teachers may be old enough to have become certified under another regulation, but it is believed others are so listed because of the absence of current transcript data.

Subject Area Preparation

The State Department of Public Instruction lists no specific subject preparation in mathematics, and any separation of a teacher's preparation into subjects taken in college is arbitrary. This report has been based upon preparation in groups of courses. The groups of courses were chosen in order to limit the analysis to a workable number of items. Each group consists of courses which make somewhat comparable contributions to the teaching of mathematics. A portion of the original data sheet is reproduced here.

..... High School Mathematics	..... Theory of Equations
Algebra	Theory of Numbers
Geometry	.....
Trigonometry	.....
.....	..... Geometry
..... College Preparatory	College or Modern Geometry
Algebra	Higher Geometry
Geometry	Solid Analyt.
..... Gen. Education Mathematics	.....
..... Elementary	..... Projective Geometry
Solid Geometry	Non-Euclidean Geometry
Intermediate Algebra	.....
College Algebra	..... Probability and Statistics
Trigonometry	Elementary Statistics
Functions and Limits	Probability
.....
..... Intermediate	..... Educational Statistics
Analytical Geometry	Business Statistics
Calculus	.....
Calculus & Analyt.	..... Analysis
.....	Advanced Calculus
..... Teaching of Mathematics	Theory of Functions
History of Mathematics	Differential Equations
Arithmetic for Teachers	.....
H. S. Mathematics for Teachers	.....
Workshop in H. S. Math.	.....
Fundamental Concepts	.....
.....	..... Application
..... Algebra	Mathematics of Finance
Abstract Algebra	Slide Rule
Modern Algebra	Desc. Geometry
Theory of Sets	Field Work
Group Theory	Astronomy
.....
.....	..... Independent Study
.....

TABLE XXIX A
SEMESTER HOURS OF COLLEGE CREDIT IN GROUPS OF
MATHEMATICS COURSES TAKEN BY HIGH SCHOOL
TEACHERS OF MATHEMATICS

Group	Number of Credit Hours						Adequate Preparation		
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	Preparation	No Credit
Elementary (Alg., Trig.)	I*	16	21	2	4	0	0	171	20
	II	18	24	5	2	0	0	332	24
	III	17	11	8	1	2	0	335	14
Intermediate (Anal. Geom., Calculus)	I	22	29	9	9	0	0	51	112
	II	24	38	17	37	1	0	168	122
	III	15	35	30	37	1	2	214	52

*I, Teachers of one Mathematics Class

II, Teachers of two or more Mathematics Classes and some other field or administration

III, Full time Mathematics Teachers

Adequate Preparation for Elementary: college algebra and trigonometry or its equivalent, and any prerequisites for these not taken in high school.

Adequate Preparation for Intermediate: completed the usual three semester sequence, Anal. Geom., Calculus I and II, or Calculus with Anal. Geom. I, II and III.

TABLE XXIX B
SEMESTER HOURS OF COLLEGE CREDIT IN GROUPS OF
MATHEMATICS COURSES TAKEN BY HIGH SCHOOL
TEACHERS OF MATHEMATICS

Group		Number of Credit Hours									No Credit
		1	2	3	4	5	6	7	8	9 an up	
Teaching of Mathematics	I*	0	26	12	4	2	1	0	1	2	187
	II	4	46	36	15	12	11	4	4	5	273
	III	2	77	25	19	14	16	4	3	12	219
Advanced Analysis (Adv. Calc., Diff. Eq.)	I	0	2	17	2	0	7	0	0	0	207
	II	0	2	38	1	3	16	2	2	8	338
	III	1	3	54	3	2	30	3	7	31	257
Geometry (College or Modern)	I	0	0	25	5	3	2	0	0	0	200
	II	0	5	54	1	1	10	0	0	0	339
	III	0	11	92	4	2	16	1	0	3	262
Applied Algebra (Theory of Equa- tions)	I	0	0	16	0	0	1	1	0	0	217
	II	0	7	58	1	2	0	0	0	0	342
	III	0	9	86	2	7	4	2	1	0	280
Probability and Statistics	I	0	7	12	0	2	1	0	0	0	213
	II	0	8	40	2	2	8	0	1	0	349
	III	0	24	39	5	6	6	0	6	4	301
Abstract Algebra	I	0	1	10	1	0	0	0	0	0	223
	II	0	8	26	0	4	2	0	0	0	370
	III	0	16	35	2	3	2	1	1	0	280

TABLE XXIX B (Continued)

Group	Number of Credit Hours										No Credit	
	1	2	3	4	5	6	7	8	9 and up			
Projective Geom.	I	0	1	9	0	0	0	0	0	0	0	225
	II	0	1	21	1	0	1	0	0	0	2	384
	III	0	1	34	1	2	11	1	0	0	1	340
Independent Study	I	0	0	0	1	0	0	1	0	0	0	233
	II	0	0	0	1	1	0	2	0	0	0	406
	III	0	5	5	9	9	1	1	1	2	0	358
Descriptive Statistics	I	0	0	2	1	0	0	1	0	0	0	231
	II	0	2	6	0	1	0	0	0	0	0	401
	III	0	1	5	1	0	0	0	0	0	0	384
Applications	I	1	25	32	8	11	4	0	3	1	1	150
	II	6	43	59	17	15	8	5	1	6	6	250
	III	12	50	51	20	26	8	11	5	13	13	195
General Education Mathematics	I	0	6	7	2	4	1	1	1	1	1	212
	II	1	13	29	5	2	2	0	1	1	1	356
	III	0	10	18	4	2	7	0	4	6	6	340

I,* Teachers of one Mathematics Class

II, Teachers of 2 or more Mathematics Classes and some other field or administration

III, Full time Mathematics Teachers

A teacher of mathematics in high school should have preparation beyond the courses offered in high school mathematics. These courses at the present time include courses in general mathematics, algebra, geometry, and trigonometry and, in a few schools, analytic geometry. It has been suggested, by some persons, using an accelerated program in high school mathematics, that calculus be made a high school course, taught in the twelfth grade. Table XXIX indicates that such a change must be far in the future, even if it should prove desirable. Relatively few teachers, at the present time, have preparation in mathematics adequate for the successful teaching of calculus according to Table XXIX, only 433 of the 1,037 mathematics teachers have completed calculus.

Table XXIX shows that 171 of the 236 teachers of single sections of mathematics have completed mathematics courses up to analytic geometry; 332 of the 410 teachers of at least two sections of mathematics have completed courses to analytic geometry, and 168 of them have completed courses through calculus. Of the 391 full-time teachers of mathematics 335 have completed courses to analytic geometry, and 214 of them have completed courses through calculus. The high percentage of teachers with no general education mathematics might seem discouraging until one considers that, in general, these courses are not taken by an individual planning to continue with mathematics as a field for teaching. If courses in the applications of mathematics are not considered, the courses most commonly taken, other than the sequential courses of algebra, trigonometry, analytic geometry, and calculus, fall in the groups which may be designated

TABLE XXX
COLLEGE SEMESTER HOUR REQUIREMENTS FOR SECONDARY SCHOOL TEACHERS OF MATHEMATICS*

STATE	Basic Requirement	Minimum Requirement	Deductions for H.S.	Blanket Certificate	Remarks
Alabama	24	18	No	No	
Alaska	Major (16)	Minor (12)	No	Yes	
Arizona	15	15	No	No	
Arkansas	15	15	Up to 6 hrs	No	
California	36	20	No	Yes	
Colorado	12	—	Up to 3	No	
Connecticut	18	18	No	No	Calculus req.
Delaware	24	—	No	Yes	See below
Dist. of Columbia	30	—	No	No	
Florida	15	—	No	No	
Georgia	20	20	No	No	See below
Hawaii	14	14	No	No	See below
Idaho	15	15	No	No	
Illinois	16	16	No	No	See below
Indiana	40	24	No	No	
Iowa	15	12	Up to 3	Yes	See below
Kansas	15	6	Up to 6	Yes	See below
Kentucky	24	18	No	No	

TABLE XXX (Continued)

STATE	Basic Requirement	Minimum Requirement	Deductions for H.S.	Blanket Certificate	Remarks
Louisiana	18	18	No	No	
Maine	18	18	No	Yes	See below
Maryland	18	18	Up to 6	No	
Massachusetts	18	9	No	No	
Michigan	15	—	No	No	
Minnesota	24	15	Up to 6	No	
Mississippi	18	18	No	Yes	
Missouri	15	15	No	No	
Montana	30	20	No	No	
Nebraska	15	12	No	Yes	
Nevada	Major	—	No	Yes	
New Hampshire	18	6	No	No	
New Jersey	18	18	No	No	
New Mexico	15	10	No	Yes	
New York	15	15	Up to 6	No	Changing '58
North Carolina	21	—	No	No	
North Dakota	30	15	No	No	See below
Ohio	—	18	No	No	
Oklahoma	24	16	Up to 5	No	See below
Oregon	12	12	No	Yes	
Pennsylvania	18	18	No	No	
Puerto Rico	15	15	No	Yes	
Rhode Island	15	15	No	No	
South Carolina	18-24	18-24	Up to 6 of 24	No	See below
South Dakota	15	15	No	No	
Tennessee	18	18	No	No	
Texas	36	18	No	No	
Utah	20	12	No	Yes	
Vermont	24	12	No	Yes	
Virginia	12	12	No	No	
Washington	Major	Minor	No	Yes	
West Virginia	18	15	No	No	
Wisconsin	15	15	No	No	
Wyoming	24	6	Up to 6	No	See below

Delaware—May teach 1 class on 8 hrs. and 2 classes on 12 hours.

Georgia—Must include 12 hours of pure mathematics.

Hawaii—Must include Solid Geometry, Trigonometry, and Teaching of Mathematics.

Illinois—Special certificate, 36 hours, minimum 8 hours if major is science.

Iowa—Deductions allowed for Advanced Algebra, Trigonometry, and Solid Geometry, 1 hour per unit.

Kansas—Changing to 18 and 15 hours in 1960, with no High School deductions.

Maine—Can teach on 8 hours under certain conditions.

North Dakota—North Central Association minor required.

Oklahoma—Allowance of 3 hours for Intermediate Algebra and 2 hours for Solid Geometry.

South Carolina—Deductions from 24 hour requirement allowed, 3 hours for Trigonometry and 3 hours for Solid Geometry.

Wyoming—Must have 1 year of mathematics in college.

*This table is an extract from the 1957 edition of A Manual on Certification Requirements for School Personnel in the United States, W. E. Armstrong and T. M. Stinnet, published by the N. E. A.

teaching of mathematics, advanced analysis, geometry, and applied algebra. Further details concerning preparation may be obtained from the tables of the appendix.

National Requirements for Mathematics Teaching

Requirements for teaching mathematics in high school vary from state to state and are given in the 1957 edition of a "Manual on Certification Requirements for School Personnel in the United States," prepared by W. Earl Armstrong and T. M. Stinnet, published by the N. E. A. A portion of one of the tables is reproduced in Table XXX. It is reprinted here with the permission of Mr. Armstrong.

Kansas is increasing the teaching requirement for mathematics to a minimum of 15 semester hours and a standard of 18 semester hours, (Certificate Handbook, State of Kansas, January 1, 1959). This modification is effective beginning with the school year 1960-61. However, the following qualification of the requirement is to apply: "Any person qualified and teaching any subject during the 1958-59 school year shall remain eligible to teach that subject even though advanced requirements are not met, provided the teacher remains in the same position and school." At the present time it is assumed that a school administrator will not allow a mathematics course to be taught by a teacher who does not meet the requirements for teaching mathematics.

Relation of College Preparation in Mathematics to the Number of Students Served

The 236 teachers who teach only a single class of mathematics have a total of 4,294 mathematics students, or an average of 19 students per section. There are 410 teachers who are not full-time mathematics teachers but who have each two or more classes in mathematics, the average being three classes. These 410 teachers have a total of 17,035 students, or an average of 14 students per section. There are 391 full-time mathematics teachers, and their average teaching load is five sections. These 391 full-time teachers have a total of 45,376 students, for an average of 23 students per section.

Of considerable significance is the number of students in classes taught by teachers with varying degrees of college preparation in mathematics. This information is condensed in Table XXXI. It should be noted that according to this table 21 teachers whose records show no college mathematics credit teach 723 mathematics students.

Seventy-four teachers with less than 6 hours of college mathematics teach a total of 2,827 mathematics students. This number, 2,827, is 4.2 per cent of the total number, 66,705, of students taking mathematics.

The number of teachers having at least 6 hours of college mathematics and less than 15 hours is 249, or 24.0 per cent of the total number of teachers of mathematics. These 249 teachers have 11,115 mathematics students,

TABLE XXXI

NUMBER OF STUDENTS TAUGHT IN MATHEMATICS BY HIGH SCHOOL TEACHERS OF MATHEMATICS BY COLLEGE CREDIT IN MATHEMATICS

Number of Teachers	Hours Credit in College Mathematics	Number of Mathematics Students	Cumulative
21	0	723	723
1	2	77	800
16	3	755	1555
8	4	382	1937
28	5	890	2827
<hr/>			
74			
23	6	964	3791
13	7	626	4417
48	8	1767	6184
20	9	781	6965
22	10	860	7825
23	11	820	8645
45	12	2649	11294
28	13	1286	12580
27	14	1362	13942
<hr/>			
323			
47	15	3472	17414
45	16	2226	19640
30	17	2271	21911
<hr/>			
445			

or 16.6 per cent of all mathematics students. Thus 13,942 mathematics students have teachers with less than 15 hours of college mathematics.

One hundred twenty-two teachers with 15 hours of mathematics and less than 18 hours teach a total of 7,969 students. Four hundred forty-five teachers, or 42.9 per cent of the mathematics teachers, teach 21,911 students, or 32.8 per cent of the mathematics students. These teachers will not qualify for the 18 hours standard to be required in 1960-61.

The average full-time teacher of mathematics teaches approximately 116 students in 5 sections. If this is accepted as a reasonable student load, then many well qualified teachers are not being used effectively. According to Table XXXII, if 24 semester hours are considered a minimum for a teaching field, 206 teachers who have this training are teaching an average of 60 or fewer mathematics students.

TABLE XXXII
NUMBER OF MATHEMATICS STUDENTS TAUGHT BY TEACHERS
WITH TWENTY-FOUR OR MORE COLLEGE HOURS
OF MATHEMATICS

Number of Teachers	Cumulative	Average No. of Students Taught	Total Students Taught	Cumulative
1	1	2	2	2
7	8	5	35	37
9	17	8	72	109
9	26	11	99	208
7	33	14	98	306
17	50	17	289	595
14	64	20	280	875
19	83	23	437	1312
18	101	26	468	1780
10	111	29	290	2070
8	119	32	256	2326
11	130	35	265	2591
10	140	38	380	2971
15	155	41	615	3586
7	162	44	308	3894
12	174	47	564	4458
5	179	50	250	4708
12	191	53	636	5344
5	196	56	280	5624
10	206	59	590	6214

If the 206 teachers who have 24 hours of mathematics or more could be used full time, each teaching 116 students, they could serve 23,896 students. This would be enough more than the 6,214 they are now teaching to take care of the 13,942 students now being taught by teachers with less than fifteen hours of college mathematics. This readjustment of teaching assignments, if put into effect, would seem to provide assurance that qualified teachers would be available. It can be seen that this cannot be accomplished while so many schools exist with enrollments below 200 students.

SUMMARY

The records of 1,037 teachers of mathematics in grades 9 to 12, inclusive, during the academic year 1957-58 were studied. Of these records, 962 were complete. Fifty per cent of the teachers of mathematics teach in schools associated with communities 1,000 or less in population; 43.2 per cent teach in high schools with less than 100 students; 66.8 per cent teach in Class A high schools; and 64.4 per cent teach in a school system organized on the 8-4 plan.

There are 236 teachers of mathematics who teach only one class in mathematics, 410 who teach two or more classes but who also teach in some other field or are administrators, and 391 teachers who teach only mathematics.

Four hundred fifteen, or 40.0 per cent, of the teachers are 35 years old or less; 536, or 51.7 per cent, have 10 or less years of experience; and 685, or 66.1 per cent, have been in their present school systems 5 years or less.

Most of the teachers, 706, graduated from Kansas high schools, and 52.3 per cent graduated from high schools in towns of populations 2,000 or less. The annual salaries ranged from below \$2,500 to over \$6,000. The average salary was \$4,386. Seventy-five per cent of the mathematics teachers received salaries between \$3,501 and \$5,000.

The most commonly taught subject was first year algebra, taught by 692 teachers. Plane geometry was taught by 461 teachers.

Three hundred twenty-six teachers of mathematics, or 31.4 per cent, teach only a single subject in mathematics. Most of these, 236 of the 326, teach only one section of this subject; the remainder of their teaching schedule being in other fields. Three hundred ninety-six teachers, or 38.2 per cent, teach two mathematics subjects; 214, or 20.6 per cent, teach 3 mathematics subjects; and the remainder, 101, or 9.7 per cent, teach 4 or more mathematics subjects.

First year algebra and plane geometry are taught as the only mathematics courses by 129 teachers, the largest number of teachers involved in any two-course combination.

Four hundred ninety-nine, or 48.1 per cent, of the teachers of mathematics in public high schools received their baccalaureate degrees from Kansas state colleges. An additional 286, or 27.2 per cent, received their degrees from other colleges in the state. Four hundred seventy-five, or 45.9 per cent, of the teachers have received their degrees within the past ten years. Four hundred ten teachers, or 39.5 per cent, have received master's degrees. Two hundred seventy-two of these degrees have been from Kansas institutions. Two hundred twenty-nine, or 55.1 per cent, of the degrees have been granted within the past 10 years.

The academic major for the bachelor's degree shows that 339, or 32.7 per cent, of the mathematics teachers majored in mathematics, while an additional 18.6 per cent have majored in science. For the master's degree, 234, or 69.4 per cent, had a major in education, and 12.5 per cent a major in mathematics. Four and seven-tenths per cent had a major in science.

The average college grade for mathematics teachers was B. The full-time mathematics teachers have somewhat better grades than those who teach part-time.

There are 21 teachers whose transcripts show no mathematics credit. However, 406 have over 24 college hours of mathematics, including one individual who has 76 college hours of mathematics.

The transcripts show that most teachers meet the current requirements for teaching in the class of school in which they are employed, 88.0 per cent of those in Class A, 84.5 per cent of those in Class B, and 83.2 per cent of those in Class C. There is no great difference in qualifications by age group, the average for the classes being 88.1 per cent qualified, by current requirements. The variations by age group run from 83.3 per cent for the 61 years and over group to 92.8 per cent for the 21 to 25 years group.

Although the transcripts were read and the original data sheets were compiled in terms of specific courses, the preparation analysis was made in terms of groups of courses. Eight hundred thirty-eight teachers had completed college algebra and trigonometry, and 433 had completed calculus. Beyond these courses most teachers had no credit in other groups of subject matter.

Six hundred seventy-nine had no credit in courses which are designed for academic background for teachers, excluding practice teaching in mathematics, 801 had no geometry in college, 839 had no advanced algebra course, while 863 had no courses in probability and statistics.

As appears from a study of Table XXX, Kansas has had the lowest requirements for teaching mathematics of any state, but, with the new regulations, the situation should be improved.

According to the available transcripts there are 21 teachers with no college credit in mathematics. They teach 723 mathematics students. In addition, there are 302 more teachers with 1 to 14 hours of college mathematics, teaching 13,219 mathematics students, for a total of 13,942 students taught by teachers with less than 15 hours of college mathematics.

There are 206 teachers of mathematics with 24 or more hours of college mathematics, these teachers having from 2 to 60 students each, for a total of 6,214. On a basis of 116 students per teacher, they could serve, in addition to their present mathematics students, all the students taught by teachers with less than 15 hours of college mathematics.

More accuracy in a survey of this type requires a complete current file of academic records for all teachers. As a means of maintaining these records up to date, the renewable certificate will be somewhat effective.

Academic preparation of teachers in itself is only one of the qualifications of an individual to do good teaching, of course, because other items must be included. Certainly attitude toward the teaching profession, attitude toward students, teaching load, and demands of extra curricular duties are all factors in determining the effectiveness of the teacher in his classroom. Nevertheless, academic preparation is important, and the data contained in this study is an attempt to show some aspects of this subject as it currently exists in the public high schools of Kansas.

APPENDIX

Tables Relating the Number of Mathematics Teachers and Credit Hours in Specific Areas of Mathematics Preparation According to College From Which Graduated

TABLE A
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN ELEMENTARY COLLEGE MATHEMATICS*

College	Number of Teachers	Number of Hours Without Adequate** Preparation										Adequate Preparation	No Credit Number	Credit Per Cent
		1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16					
All Colleges	1037	7	51	56	15	7	4	0	0	0	0	838	58	5.6
KSTC Pittsburg	128	0	5	7	4	0	0	0	0	0	0	109	3	2.3
KSTC Emporia	112	0	5	5	2	1	2	0	0	0	0	87	10	8.9
Ft. Hays Kansas State College	95	0	5	7	0	0	1	0	0	0	0	78	4	4.2
K. State College	93	1	5	2	0	0	0	0	0	0	0	82	3	3.2
University of Kansas	71	3	5	7	2	0	1	0	0	0	0	53	0	0.0
Kansas Independent Colleges	226	2	13	14	3	2	0	0	0	0	0	177	15	6.6
Kansas Municipal Colleges	60	0	3	5	0	1	0	0	0	0	0	46	5	8.3
Oklahoma Colleges	108	0	4	4	1	1	0	0	0	0	0	92	6	5.5
Other Colleges	143	1	6	5	3	2	0	0	0	0	0	114	12	8.4
No record of degree	1													

* Elementary College Mathematics includes college algebra, and where not taken in high school, trigonometry, intermediate algebra, and solid geometry or their equivalents.

** Adequate refers to satisfying prerequisites for analytic geometry.

TABLE B
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
HOURS IN INTERMEDIATE COLLEGE MATHEMATICS*

College	Number of Teachers	Number of Hours Without Adequate** Preparation										Adequate Preparation	No Credit Number	Credit Per Cent
		1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16					
All Colleges	1037	11	61	102	56	83	2	2	0	433	286	27.6		
KSTC Pittsburg	128	0	1	27	2	13	0	0	0	56	29	22.7		
KSTC Emporia	112	1	18	2	4	8	0	1	0	48	30	26.8		
Ft. Hays Kansas State College	95	1	2	12	2	6	0	0	0	40	32	33.7		
K. State College	93	1	14	4	10	7	1	0	0	26	30	32.3		
University of Kansas	71	1	2	10	2	11	0	0	0	29	16	22.5		
Kansas Independent Colleges	226	4	13	18	17	11	0	0	0	107	56	24.8		
Kansas Municipal Colleges	60	0	1	4	3	8	0	0	0	23	21	35.0		
Oklahoma Colleges	108	2	4	12	4	10	1	0	0	41	34	31.5		
Other Colleges	143	1	6	13	12	9	0	1	0	63	38	26.6		
No record of degree	1													

* Intermediate College Mathematics includes analytic geometry, calculus, and calculus with analytic geometry.

** Adequate means the equivalent of analytic geometry and two semesters of calculus, i.e. approximately 12 semester hours.

TABLE C
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN TEACHING OF MATHEMATICS*

College	Number of Teachers	Number of Hours										No Credit Number	Per Cent
		1	2	3	4	5	6	7	8	Over 8			
All Colleges	1037	6	149	73	38	28	28	8	8	19	679	65.5	
KSTC Pittsburg	128	0	10	16	7	12	6	3	2	0	72	56.2	
KSTC Emporia	112	0	32	4	18	1	9	0	2	5	41	36.6	
Ft. Hays Kansas State College	95	2	19	3	0	0	2	0	0	2	67	70.5	
K. State College University of Kansas	93	0	1	7	2	0	1	1	0	1	80	86.0	
University of Kansas	71	0	12	3	0	9	1	2	0	5	39	54.9	
Kansas Independent Colleges	226	2	23	20	4	3	4	1	1	2	166	73.5	
Kansas Municipal Colleges	60	0	4	5	0	1	1	0	0	0	49	81.7	
Oklahoma Colleges	108	0	30	2	4	1	2	0	0	1	68	63.0	
Other Colleges	143	2	18	13	3	1	2	1	3	3	97	67.8	
No record of degree	1												

* Teaching of Mathematics includes History of Mathematics, Arithmetic for Teachers, H. S. Mathematics for Teachers, Workshop in H. S. Mathematics, Fundamental Concepts of Mathematics, or similar courses.

TABLE D
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER HOURS
IN GEOMETRY*

College	Number of Teachers	Number of Hours								No Credit		
		1	2	3	4	5	6	7	8	Over 8	Number	Per Cent
All Colleges	1037	0	16	171	10	6	28	1	0	3	801	77.3
KSTC Pittsburg	128	0	2	20	0	0	4	0	0	0	102	79.7
KSTC Emporia	112	0	0	45	1	0	5	0	0	0	61	54.5
Ft. Hays Kansas State College	95	0	0	13	0	1	3	0	0	0	78	82.1
K. State College	93	0	1	9	2	0	1	0	0	0	80	86.0
University of Kansas	71	0	3	2	0	1	1	0	0	2	62	87.3
Kansas Independent Colleges	226	0	4	20	0	2	5	0	0	1	194	85.8
Kansas Municipal Colleges	60	0	2	9	0	0	2	0	0	0	47	78.3
Oklahoma Colleges	108	0	1	32	5	0	6	0	0	0	64	59.3
Other Colleges	143	0	3	21	2	2	1	1	0	0	113	79.0
No record of degree	1											

*Geometry includes College Geometry, Modern Geometry, Solid Analytic Geometry, Higher Geometry, and similar courses.

TABLE E
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
HOURS IN ABSTRACT ALGEBRA*

College	Number of Teachers	Number of Hours										No Credit	
		1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	0	25	71	3	7	4	1	1	0	924	89.2	
KSTC Pittsburg	128	0	7	3	0	0	0	0	0	0	118	92.2	
KSTC Emporia	112	0	1	10	0	2	0	0	0	0	99	88.4	
Ft. Hays Kansas State College	95	0	1	6	1	0	1	0	0	0	86	90.5	
K. State College University of Kansas	93	0	1	2	0	0	0	0	0	0	90	96.8	
Kansas Independent Colleges	71	0	10	2	0	2	0	1	0	0	56	78.9	
Kansas Municipal Colleges	226	0	2	18	0	3	2	0	0	0	201	88.9	
Oklahoma Colleges	60	0	0	9	0	0	0	0	0	0	51	85.0	
Other Colleges	108	0	1	13	0	0	0	0	0	0	94	87.0	
No record of degree	143	0	2	8	2	0	1	0	1	0	129	90.2	
No record of degree	1												

*Abstract Algebra includes Abstract Algebra, Modern Algebra, Theory of Sets, Group Theory, Theory of Numbers, and similar courses.

TABLE F
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER HOURS
IN PROBABILITY AND STATISTICS*

College	Number of Teachers	Number of Hours										No Credit	
		1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	0	39	91	7	10	15	0	7	4	863	83.3	
KSTC Pittsburg	128	0	10	27	0	2	10	0	7	2	70	54.7	
KSTC Emporia	112	0	1	10	0	0	0	0	0	0	101	90.2	
Pt. Hays Kansas State College	95	0	8	2	1	0	0	0	0	0	84	88.4	
K. State College	93	0	0	11	0	0	0	0	0	0	82	88.2	
University of Kansas	71	0	2	6	0	3	1	0	0	0	59	83.1	
Kansas Independent Colleges	226	0	3	23	1	3	3	0	0	2	191	84.5	
Kansas Municipal Colleges	60	0	5	4	3	0	0	0	0	0	48	80.0	
Oklahoma Colleges	108	0	5	3	0	0	0	0	0	0	100	92.6	
Other Colleges	143	0	5	5	2	2	1	0	0	0	128	89.5	
No record of degree	1												

*Probability and Statistics includes Probability, Elementary Statistics, or Mathematical Statistics, but not Educational or Business Statistics.

TABLE G
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN ADVANCED ANALYSIS*

College	Number of Hours										No Credit	
	1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	7	109	6	5	53	5	9	39	82	77.4	
KSTC Pittsburg	128	2	18	0	1	5	0	1	8	93	72.7	
KSTC Emporia	112	0	7	0	0	3	0	0	2	100	89.3	
Ft. Hays Kansas State College	95	0	16	0	2	2	2	1	2	70	73.7	
K. State College	93	1	3	0	0	6	0	2	1	80	85.9	
University of Kansas	71	0	9	0	1	7	0	1	3	50	70.4	
Kansas Independent Colleges	223	2	39	1	1	21	3	2	16	150	66.4	
Kansas Municipal Colleges	60	0	10	0	0	5	0	0	0	45	75.0	
Oklahoma Colleges	168	1	4	4	0	2	0	1	1	95	58.0	
Other Colleges	143	0	12	1	0	2	0	1	6	119	83.2	
No record of degree	1											

*Advanced Analysis includes Advanced Calculus, Theory of Functions, Differential Equations, and similar courses.

TABLE H
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
HOURS IN PROJECTIVE GEOMETRY*

College	Number of Hours										No Credit	
	1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	0	3	64	2	2	12	1	0	3	949	91.6	
KSTC Pittsburg	0	0	7	0	0	0	0	0	0	121	94.5	
KSTC Emporia	0	0	6	0	0	0	0	0	1	105	93.8	
Ft. Hays Kansas State College	0	1	2	0	0	0	0	0	0	92	96.8	
K. State College	0	0	3	0	0	0	0	0	0	90	96.8	
University of Kansas	0	1	18	0	0	9	0	0	1	42	59.2	
Kansas Independent Colleges	0	0	20	1	2	3	0	0	1	199	88.1	
Kansas Municipal Colleges	0	0	2	0	0	0	0	0	0	58	96.7	
Oklahoma Colleges	0	0	0	0	0	0	0	0	0	108	100.0	
Other Colleges	0	1	6	1	0	0	1	0	0	134	93.7	
No record of degree												

*Projective Geometry includes Projective Geometry, Non-Euclidean Geometry, and similar courses.

TABLE I
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN APPLIED ALGEBRA*

College	Number of Teachers	Number of Hours								No Credit		
		1	2	3	4	5	6	7	8	Over 8	Number	Per Cent
All Colleges	1037	0	16	160	3	9	5	3	1	0	839	81.0
KSTC Pittsburg	128	0	8	18	1	3	0	1	0	0	97	75.8
KSTC Emporia	112	0	0	5	1	0	0	0	0	0	106	94.6
Ft. Hays Kansas State College	95	0	1	19	0	0	1	1	0	0	73	76.8
K. State College	93	0	1	7	0	0	1	0	0	0	84	90.3
University of Kansas	71	0	1	17	0	4	0	0	1	0	48	67.6
Kansas-Independent Colleges	226	0	0	46	1	2	2	1	0	0	174	77.0
Kansas Municipal Colleges	60	0	0	11	0	0	0	0	0	0	49	81.7
Oklahoma Colleges	108	0	2	18	0	0	0	0	0	0	88	81.5
Other Colleges	143	0	3	19	0	0	1	0	0	0	120	83.9
No record of degree	1											

* Applied Algebra includes Theory of Equations and similar courses.

TABLE J
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER HOURS
IN INDEPENDENT STUDY *

College	Number of Teachers	Number of Hours										No Credit	
		1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	0	5	5	11	10	1	4	1	2	2	997	96.2
KSTC Pittsburg	128	0	1	1	9	1	0	0	0	0	0	116	90.6
KSTC Emporia	112	0	1	0	0	2	0	2	1	0	0	108	94.6
Ft. Hays Kansas State College	95	0	0	0	0	0	0	1	0	0	0	94	98.9
K. State College University of Kansas	93	0	0	0	0	0	0	0	0	0	0	93	100.0
Kansas Independent Colleges	71	0	0	0	0	2	0	0	0	0	0	69	97.2
Kansas Municipal Colleges	226	0	2	3	0	3	0	1	0	1	0	216	95.6
Kansas Colleges	60	0	0	0	0	1	0	0	0	0	0	59	98.3
Oklahoma Colleges	108	0	0	0	0	0	0	0	0	0	0	108	100.0
Other Colleges	143	0	1	1	2	1	1	0	0	1	0	136	95.1
No record of degree	1												

* Independent Study includes research, thesis and independent study in mathematics for advanced undergraduates.

TABLE K
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN DESCRIPTIVE STATISTICS*

College	Number of Hours										No Credit	
	1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	0	13	2	1	0	1	0	0	1016	98.1	
KSTC Pittsburg	128	2	6	0	1	0	0	0	0	119	93.0	
KSTC Emporia	112	0	0	0	0	0	0	0	0	112	100.0	
Ft. Hays Kansas State College	95	0	1	0	0	0	0	0	0	94	98.9	
K. State College	93	0	0	0	0	0	0	0	0	93	100.0	
University of Kansas	71	0	2	0	0	0	0	0	0	69	97.2	
Kansas Independent Colleges	226	0	3	0	0	0	1	0	0	222	98.2	
Kansas Municipal Colleges	60	0	0	0	0	0	0	0	0	60	100.0	
Oklahoma Colleges	108	0	0	1	0	0	0	0	0	107	99.1	
Other Colleges	143	0	1	1	0	0	0	0	0	140	97.9	
No record of degree	1											

* Descriptive Statistics includes Educational Statistics, Business Statistics and similar courses.

TABLE L
NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
HOURS IN APPLICATIONS*

College	Number of Hours								No Credit		
	1	2	3	4	5	6	7	8	Over 8	Number	Per Cent
All Colleges	19	118	142	45	52	20	16	9	20	595	57.4
KSTC Pittsburg	3	17	29	5	17	5	5	2	9	36	28.1
KSTC Emporia	2	27	15	5	11	1	5	0	3	43	38.4
Ft. Hays Kansas State College	0	5	12	3	3	2	0	0	0	70	73.7
K. State College	0	17	5	6	1	1	1	1	0	61	65.6
University of Kansas	0	6	8	1	1	0	1	1	0	53	74.6
Kansas Independent Colleges	6	17	23	7	6	7	2	2	2	154	68.1
Kansas Municipal Colleges	2	12	8	6	3	0	0	1	2	26	43.3
Oklahoma Colleges	3	9	15	2	1	1	0	0	1	76	70.4
Other Colleges	3	8	27	10	9	3	2	2	3	76	53.1
No record of degree										1	

* Applications includes courses taught as applications of mathematics, such as: Mathematics of Finance, Mathematics of Investment, Slide Rule, Descriptive Geometry, Field Work in Mathematics, and Astronomy.

TABLE M
 NUMBER OF TEACHERS OF MATHEMATICS WITH SEMESTER
 HOURS IN GENERAL EDUCATION MATHEMATICS*

College	Number of Hours										No Credit	
	1	2	3	4	5	6	7	8	Over 8	Number	Per Cent	
All Colleges	1037	29	54	11	8	10	1	6	8	908	87.6	
KSTC Pittsburg	128	1	9	0	4	1	1	1	0	111	86.7	
KSTC Emporia	112	15	6	3	1	1	0	0	0	85	75.9	
Ft. Hays Kansas State College	95	2	11	0	0	1	0	0	0	81	85.3	
K. State College	93	0	0	0	0	0	0	1	0	92	98.9	
University of Kansas	71	1	3	1	0	0	0	0	0	66	93.0	
Kansas Independent Colleges	226	0	8	2	2	2	0	3	4	205	90.7	
Kansas Municipal Colleges	60	0	1	1	0	1	0	1	2	54	90.0	
Oklahoma Colleges	108	0	4	0	1	1	0	0	1	95	88.0	
Other Colleges	143	0	6	10	4	0	0	0	1	119	83.2	
No record of degree	1											

*Usually not considered as a course for mathematics teacher preparation, but a liberal arts course taken by non-mathematics majors or minors.

TABLE N
AVERAGE GRADES OF 1018 TEACHERS OF MATHEMATICS
FOR WHOM GRADES WERE AVAILABLE

College	Number of Teachers	A	A—, B+	B	B—, C+	C	C—
All Colleges	1018	39	68	452	119	276	64
Per Cent		3.8	6.7	44.4	11.7	27.1	6.3
Cumulative Per Cent		3.8	10.5	54.9	66.6	93.7	100.0
KSTC Pittsburg	127	5	10	66	12	28	6
Per Cent		3.9	7.9	52.0	9.4	22.0	4.7
Cumulative Per Cent		3.9	11.8	63.8	73.2	95.3	100.0
KSTC Emporia	110	5	7	48	8	35	7
Per Cent		4.5	6.4	43.6	7.3	31.8	6.4
Cumulative Per Cent		4.5	10.9	54.5	61.8	93.6	100.0
Ft. Hays Kansas State College	94		6	40	15	30	3
Per Cent			6.4	42.6	16.0	31.9	3.2
Cumulative Per Cent			6.4	48.9	64.9	96.8	100.0
K. State College	92	4	4	27	9	35	13
Per Cent		4.3	4.3	29.3	9.8	38.0	14.1
Cumulative Per Cent		4.3	8.7	38.0	47.8	85.9	100.0
University of Kansas	71	3	7	31	10	14	6
Per Cent		4.2	9.9	43.7	14.1	19.7	8.5
Cumulative Per Cent		4.2	14.1	57.7	71.8	91.5	100.0
Kansas Independent Colleges	222	7	14	99	31	55	16
Per Cent		3.2	6.3	44.6	14.0	24.8	7.2
Cumulative Per Cent		3.2	9.5	54.1	68.0	92.8	100.0
Kansas Municipal Colleges	57	2	2	27	9	12	5
Per Cent		3.5	3.5	47.4	15.8	21.1	8.8
Cumulative Per Cent		3.5	7.0	54.4	70.2	91.2	100.0
Oklahoma Colleges	105	6	6	56	5	29	3
Per Cent		5.7	5.7	53.3	4.8	27.6	2.9
Cumulative Per Cent		5.7	11.4	64.8	69.5	97.1	100.0
Other Colleges	140	7	12	58	20	38	5
Per Cent		5.0	8.6	41.4	14.3	27.1	3.6
Cumulative Per Cent		5.0	13.6	55.0	69.3	96.4	100.0

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