A GRAPHIC COMPARISON OF STANDARDIZED TEST SCORES IN BOOKKEEPING I WITH I.Q. SCORES OF SOPHOMORES, JUNIORS, AND SENIORS

BY

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INTRODUCTION

The status of business education today would indicate its importance in most high schools. Paul S. Lomax[1], New York University, in an article in the Journal of Business Education, states that there are more than five million business enrollments in the secondary schools of the United States, and several million more in colleges, junior colleges, private business schools, and adult education classes.

With the growth in the size of business units, as told by Tonne[2], bookkeeping became a necessary skill in the control of business. When few businesses had gross incomes of over $100,000 a year, double-entry bookkeeping was not needed. When the Civil War brought with it a great concentration of business enterprise caused by the necessity of supplying the armies with food, clothing, and munitions, large mercantile establishments developed.

This organization of large industrial and financial units continued after the Civil War and resulted in a steady demand for competently trained bookkeepers. Then when government became more concerned with the inner workings of railroads and banking houses, accountancy developed; and it became more difficult for the young accountant to learn his art on the job. This development encouraged business education.

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[1]Lomax, Paul S., Journal of Business Education, March, 1956

[2]Tonne, Herbert a., Principles of Business Education, Gregg Publishing Company, 1957

It is the opinion of Tonne[3], that the high schools of today are probably teaching bookkeeping to over half a million students. He feels that the subject of bookkeeping as it has been and still is being taught in the high schools does not meet the needs of the present day business world. When bookkeeping was first introduced into the high school, its objective was primarily vocational. The content of the courses and the method of teaching were patterned after those of the private business school, where the emphasis was placed, and still is, on the immediate vocational efficiency of the student. As soon as bookkeeping had established a place for itself in the high school, administrators and teachers began to feel that its position was not justified by its mere job-getting value. They wished to endow it with cultural purposes. They felt that it was just as useful to the students as the more traditional subjects because of its disciplinary or transfer-of-training values and its help in making the student a better citizen. They believed that the careful thinking required in the keeping of accounts would carry over into other fields. Because bookkeeping stressed neatness in writing and honesty in recording, these traits whould carry over into other activities for those taking this subject. However, by 1925, the disciplinary objectives of bookkeeping had become unimportant. Educational psychologists had shown that transfer-of training value was inherent in no subject, but that it existed in any subject where genuine provision was made for such transfer to outside activities.

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[3]Tonne, Herbert A., Principles of Business Education, Gregg Publishing Company, 1957.

Until just recently bookkeeping received far more attention from business educators than did the stenographic program. This was justified because at that time bookkeeping was the open-sesame to service in business either as a worker or as an entrepreneur. Today, however, the general bookkeeper has disappeared from many business offices. His place has been taken by the auditor and accountant, who are required to have professional knowledge; by numerous ledger clerks, who need specialized instruction based on duties performed; and by bookkeeping-machine operators, whose numbers have increased rapidly. Many small businesses now hire an accountant for a day or two a month to work out their records for them. This is a much less expensive procedure than the full-time services of any bookkeeper they could hire. Because of this the objectives of bookkeeping in high schools today have changed.

In relatively recent years numerous laws have been passed that add to and complicate the bookkeeping procedure. These laws relate to such things as income taxes, social security, workmen's compensation, and wages and hours of employment. All of these laws have added to the volume of bookkeeping work that is required and to the complexity of the bookkeeping procedures. Furthermore, in addition to withholding from employees' wages the amounts required by the government for social security and income taxes, businesses often agree with their employees to withold amounts for other purposes, such as insurance, hospital care, union dues, and bond purchases. Therefore, many businesses, which in the past did or did not keep books, as they chose, now have no option and must not only keep accurate records but also keep them in a manner

required by law.[4]

It is quite obvious not only that bookkeeping is more important in our economy today, but also that there is more of it in both the business world and in the home. This means that today's high school student of vocational bookkeeping has a larger market for his services than previously and can find ample use for such knowledge and skill in his personal and future family life.

A knowledge of bookkeeping has importance for people other than the vocational bookkeeper or the person training to become a bookkeeper. Such understanding can be important and helpful to the typist who types statements and material dealing with financial transactions, to the secretary who takes dictation and transcribes information dealing with business transactions and records, to the file clerk who stores and must find business records quickly, to the salesperson who records cash and charge transactions and who is concerned with inventories and sales taxes, to the person planning to operate his own farm, service station, garage, beauty parlor, or store, and to the management of any business. Lack of proper records and the understanding of such records is one of the most frequent causes of business failure. Finally, the importance of bookkeeping is related to the individual and family budgetkeeper who has difficulty living within a fixed income, keeping a checking account, preparing personal income tax statements, recording and reporting social security deductions from the pay of domestic employees, and the like.

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[4]Boynton, Lewis D., Methods of Teaching Bookkeeping, South-Western Publishing Company, Cincinnati, Ohio, 1955.

Since the first course in bookkeeping was introduced in the high school in 1824, bookkeeping enrollments have been increasing steadily. In 1915 the total enrollment in bookkeeping was 39,816. Thirty-four years later in 1949, the bookkeeping enrollment had risen to 472,163. Although there has been a considerable increase in the number of students enrolling in bookkeeping courses over the past forty years, it is also true that the increase in bookkeeping enrollments has not kept pace with the increase in the total high school enrollments. Therefore, while national enrollments in bookkeeping courses have been increasing constantly, it is also true that they have not been increasing in equal proportion to the total increase in high school enrollments. This difference can be traced to at least three related trends: 1. The teaching of bookkeeping courses at the junior college level has caused some students to delay their vocational training to the post high school years. 2. There has been a trend to decrease the number of years for offering bookkeeping training in the high school. 3. More high school students than ever before have been going to college, and this may cause more students than formerly to concentrate on a college preparatory curriculum while in high school.[5]

Bookkeeping retains its popularity in the high school in spite of the fact that its objectives have, in a large measure, been discounted. The subject has virtues that many courses lack: Its subject matter is concrete, involves organized thinking, and is developed by means of related units from the first topic to the last. The content also offers the student

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[5]Boynton, Lewis D., Methods of Teaching Bookkeeping, South-Western Publishing Company, Cincinnati, Ohio, 1955.

a learning challenge.

The Department of Public Instruction[6] of the State of Montana, in its 1964-1965 report, showed that there were 22,755 secondary students enrolled in business subjects. 10,651, or approximately 50%, were enrolled in typing. The second largest group, 4,368, were enrolled in bookkeeping and accounting. It was interesting to note that only one school in Montana offered record keeping. This is a strong indication that the schools of Montana are mainly concerned with the vocational aspects of bookkeeping and accounting instead of the personal use aspects.

The third largest group totaling 3,466 students were enrolled in shorthand. Two thousand sixty-four students were enrolled in general business, 575 students were enrolled in clerical or office practice, 517 students were enrolled in business law, and a total of 1,114 students were enrolled in business machines, economics, business math, business English, and distributive education.

The Department of Public Instruction[7] of the State of Montana, in its 1965-1966 report of Montana High School Business Education Teachers, shows that 306 business education teachers were employed by 167 Montana secondary schools.

These figures show the extent of business education in our school system today. Business education is an important part of our education picture.

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[6]Department of Public Instruction, State of Montana, Enrollments in Montana High School Business Subjects, 1964-1965.

[7]Department of Public Instruction, State of Montana, 1965-66 Montana High School Business Education Teachers, VE-be-3-2/66-350.

STATEMENT OF THE PROBLEM

Bookkeeping is not one of the required subjects for graduation in Montana secondary schools. It is an elective subject taken by students enrolled in a business curriculum or any other student who so desires. Some schools have the bookkeeping course available for twelfth grade students only, some for the eleventh and twelfth grade students only, and in some schools, tenth, eleventh, or twelfth grade students may enroll. At Park High School, Livingston, Montana, any student from the tenth through the twelfth grade, inclusive, may enroll in Bookkeeping I. The intent of this study is to find the answers to these questions: 1. Will a tenth grade student with the same intelligence quotient as an eleventh or twelfth grade student succeed equally well in Bookkeeping I? 2. Can a student's I.Q. be used to counsel a student to enroll in the bookkeeping course?

PROCEDURES

During two consecutive school years beginning in the fall of 1964, seven standardized tests published by the South-Western Publishing Company were administered to 44 seniors, 47 juniors, and 107 sophomores who were enrolled in Bookkeeping I at Park High School, Livingston, Montana. Eight of the senior test scores, six of the junior test scores, and ten of the sophomore test scores were discarded because of being incomplete. Dropouts and transfers to other schools were the main reasons for not having the complete scores. The seven tests were scored and graded on the basis of 100.

From the permanent files in the office of Park High School, the

intelligence quotient scores of all students, as determined by the Henmon Nelson test of Mental Ability, were listed. The students in each grade were then separated into five groups: 1. I.Q. 120 and over, 2. I.Q. 110-120, 3. I.Q. 100-110, 4. I.Q. 90-100, and 5. I.Q. under 90. The test scores of the students in each group were totaled and the average found for the two years separately, and the two years combined. These averages were then plotted.

LIMITATIONS

This study was limited to the students enrolled in Bookkeeping I at Park High School, Livingston, Montana, because of the availability of their records.

DEFINITION OF TERMS

A school year begins in August or September of one year and concludes in May or June of the following year. They are usually designated, for example, as the school year 1955-1956. Throughout this paper, the school year 1964-1965 will be called the school year 1964, and the school year 1965-1966 will be called the school year 1965.

CHAPTER II

REVIEW OF LITERATURE

A review of the literature dealing with studies of this nature was made in the library of Montana State University, Bozeman, Montana.

The high mortality rate in the subject of bookkeeping would seem to indicate the need for a more accurate method of selection. Studies indicate that an intelligence quotient of at least 90 is necessary, although interest may partially compensate for intelligence if the interest is strong enough. More important, however, are the desirable qualities we should look for. These are a logical mind, exactness, neatness, and perseverance.[1]

Satterfield[2], in his study, found that there is a rather substantial relationship between reading and vocabulary scores and bookkeeping scores. Students should have at least a tenth grade reading ability to enjoy much success in bookkeeping.

Linn[3], made the following conclusions from his study of the predictive value of selected factors for success in first-semester bookkeeping. 1. Scores on the California Test of Mental Maturity show a definite relationship to failure or success in beginning bookkeeping. 2. Reading

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[1]"Report of the Bookkeeping Committee," The Balance Sheet, XXXII, March, 1951, 297-9.

[2]Satterfield, Rullel A., "An Experimental Investigation of the Correlation between Reading Scores and Bookkeeping Scores.", M.S., University of Southern California, 1956. The National Business Education Quarterly, Volume XXVI, October, 1956, No. 1.

[3]Linn, Donald M., "The Predictive Value of Selected Factors for Success in First-Semester Bookkeeping.", M.A., San Francisco State College, 1957. The National Business Education Quarterly, Volume XXVII, October, 1958 No. 1.

grade placement and arithmetic grade-placement show the closest relationship to achievement in beginning bookkeeping. 3. A grade of "D" in a mathematics content subject is commonly accompanied by considerable difficulty with the study of bookkeeping.

Phelps[4], came to the following conclusions: 1. Intelligence test scores were a better predictor of success in Bookkeeping III (Third Semester), than in any other semester. 2. Arithmetic marks and ability were more indicitive of bookkeeping success than were reading comprehension and intelligence. 3. Reading comprehension correlated higher with success in bookkeeping than did intelligence test results. 4. No one of the factors was sufficiently predictive by itself to be of great guidance value.

Tamura[5], concluded that bookkeeping should be offered as an elective subject in either grade 11 or 12.

The reading and vocabulary relationship to success in bookkeeping is probably explained best by Fischer[6] who found 524 terms peculiar to bookkeeping.

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[4]Phelps, Beatrice V., "A Statistical Study of the Relationship Between Bookkeeping Marks and Four other Measures of Student Ability at the High School Level.", M.S. University of Southern California, 1957. The National Business Education Quarterly, Volume XXVII, October, 1958, No. 1.

[5]Tamura, Catherine T., "An Analysis of Literature on High School Elementary Bookkeeping." M.S., The University of Wisconsin, 1957. The National Business Education Quarterly, Volume XXVII, October, 1958, No. 1.

[6]Fischer, Wilbert Roy, "A Word Frequency Study and Glossary of Terms Peculiar to Bookkeeping Teaching Methodology.", M.S., University of North Dakota, 1959. The National Business Education Quarterly, Volume 29, October 1960, No. 1.

SUMMARY

From these and other similar studies consulted, the following traits were found to have a substantial relationship to success in bookkeeping.

1. Mathematics skill.
2. Reading skill.
3. Vocabulary.
4. Intelligence quotient.

Although mathematics probably has the closest correlation to success in bookkeeping, the other traits should be taken into consideration when counseling a student to enroll in bookkeeping.

CHAPTER III

A COMPARISON OF AVERAGE STANDARDIZED TEST SCORES WITH I.Q. SCORES OF SOPHOMORES, JUNIORS, AND SENIORS

Seven standardized tests published by the South-Western Publishing Company were administered to the sophomores, juniors, and seniors enrolled in Bookkeeping I at Park High School, Livingston, Montana, during the two school years, 1964 and 1965. The tests were graded on the basis of 100. The students in each grade were separated into five groups: 1. I.Q. 120 and over, 2. I.Q. 110-120, 3. I.Q. 100-110, 4. I.Q. 90-100, 5. I.Q. under 90. The test scores of the students in each group were totaled and the average found for the two years separately, and the two years combined.

The grade scale at Park High School is as follows: Below 75--F, 75 to 80--D, 80 to 88--C, 88 to 94--B, and 94 to 100--A.

Group 1, I.Q. 120 and over

Twenty-four percent of the seniors, 15% of the juniors, and 8% of the sophomores comprised group 1. The graphs showing their average test scores during the school year 1964, the school year 1965, and the two years combined, are depicted in Figure 1, Figure 2, and Figure 3.

During the school year 1964, the average of the grades of the sophomores, juniors, and seniors, on all seven standardized tests, were very nearly uniform (Figure 1). On test Number 1, the averages varied by only one point. On test Number 2, the averages varied by three points. On tests Number 4, Number 5, and Number 6, the averages varied by four points, and on tests Number 3 and Number 7, the averages varied by five points. These figures indicate that no group, sophomores, juniors, or seniors

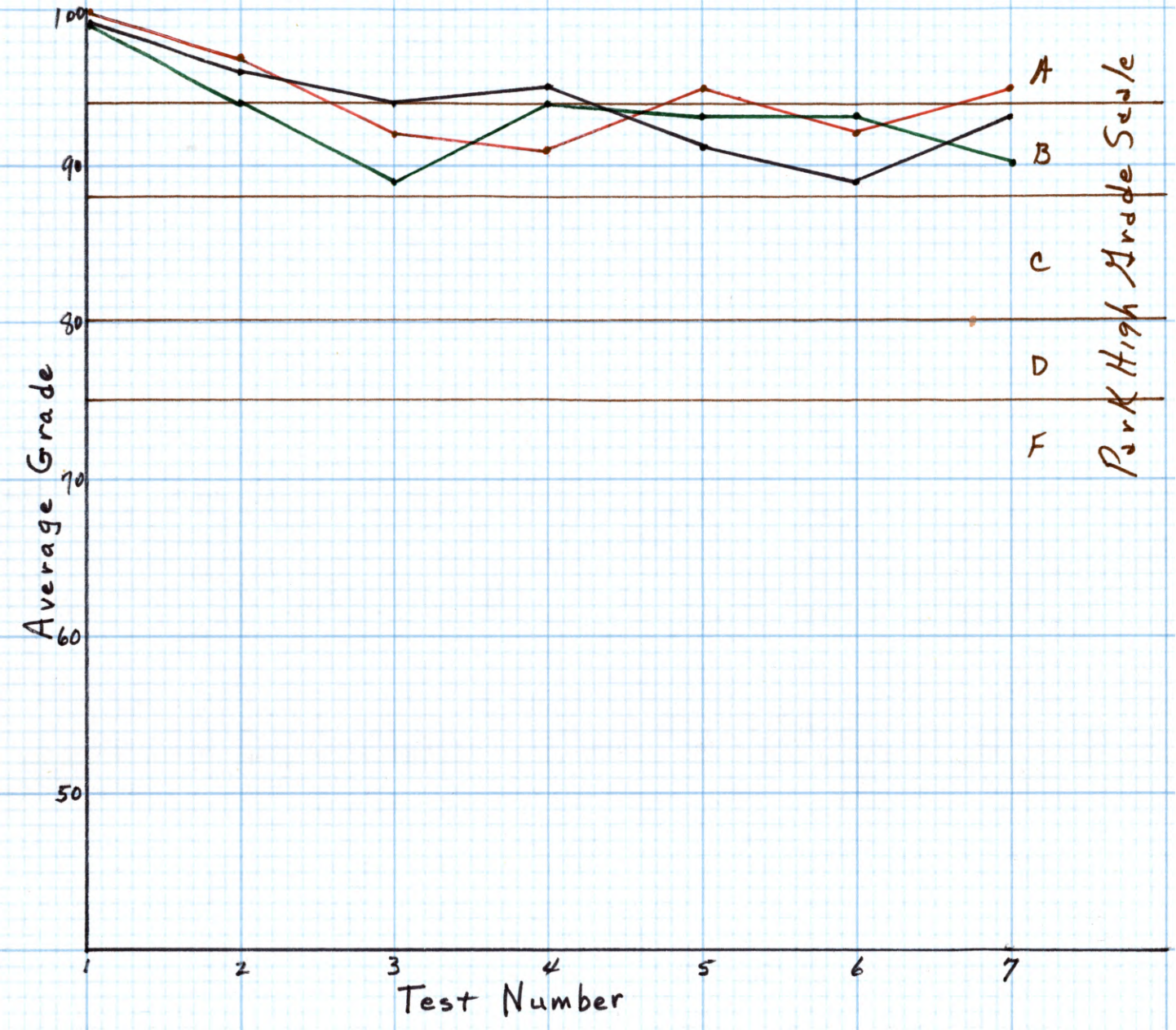

Figure 1 – School Year 1964
I.Q. - over 120

Seniors ——
Juniors ——
Sophomores ——

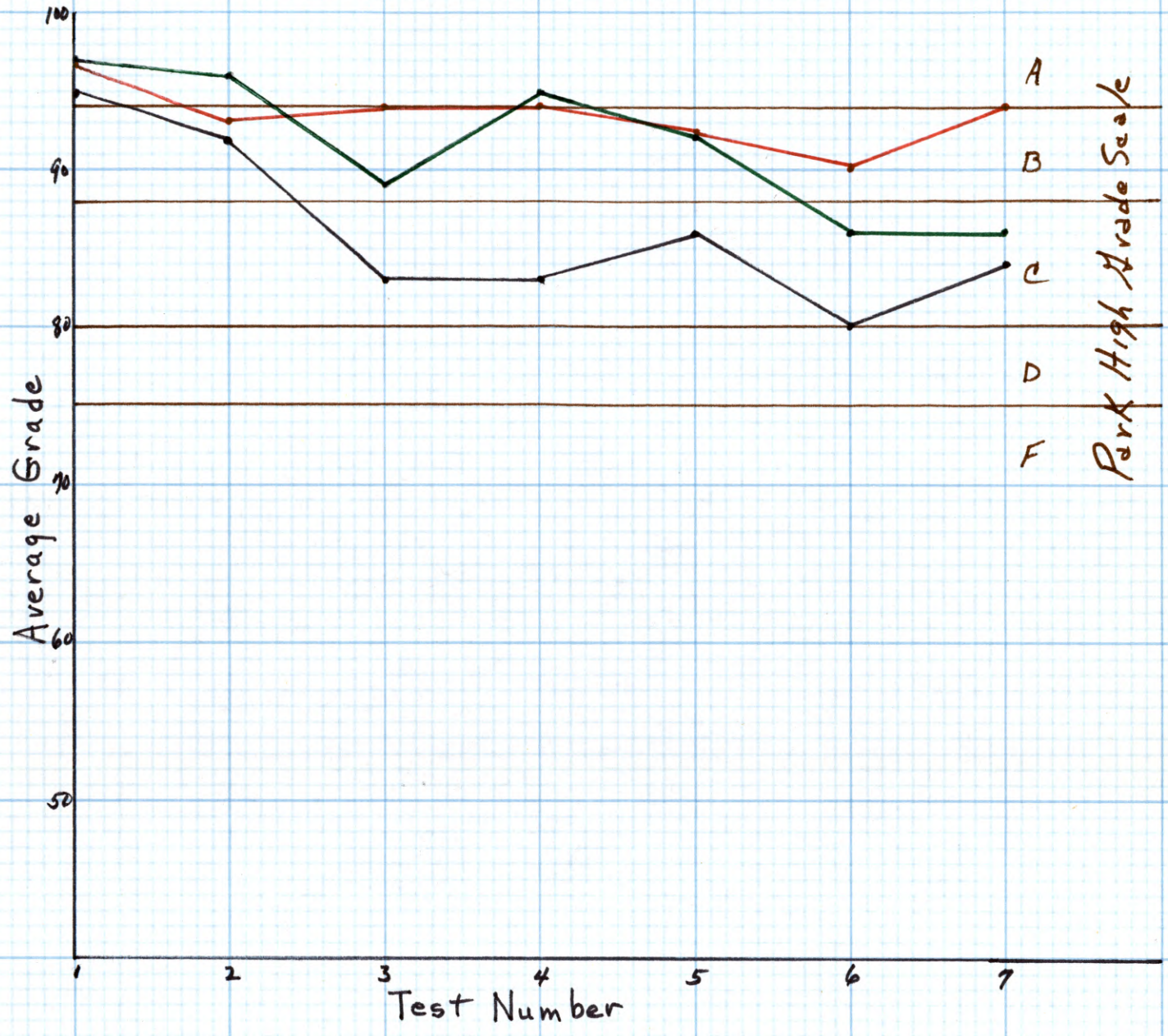

Figure 2 - School Year 1965
I.Q. over 120

Seniors
Juniors
Sophomores

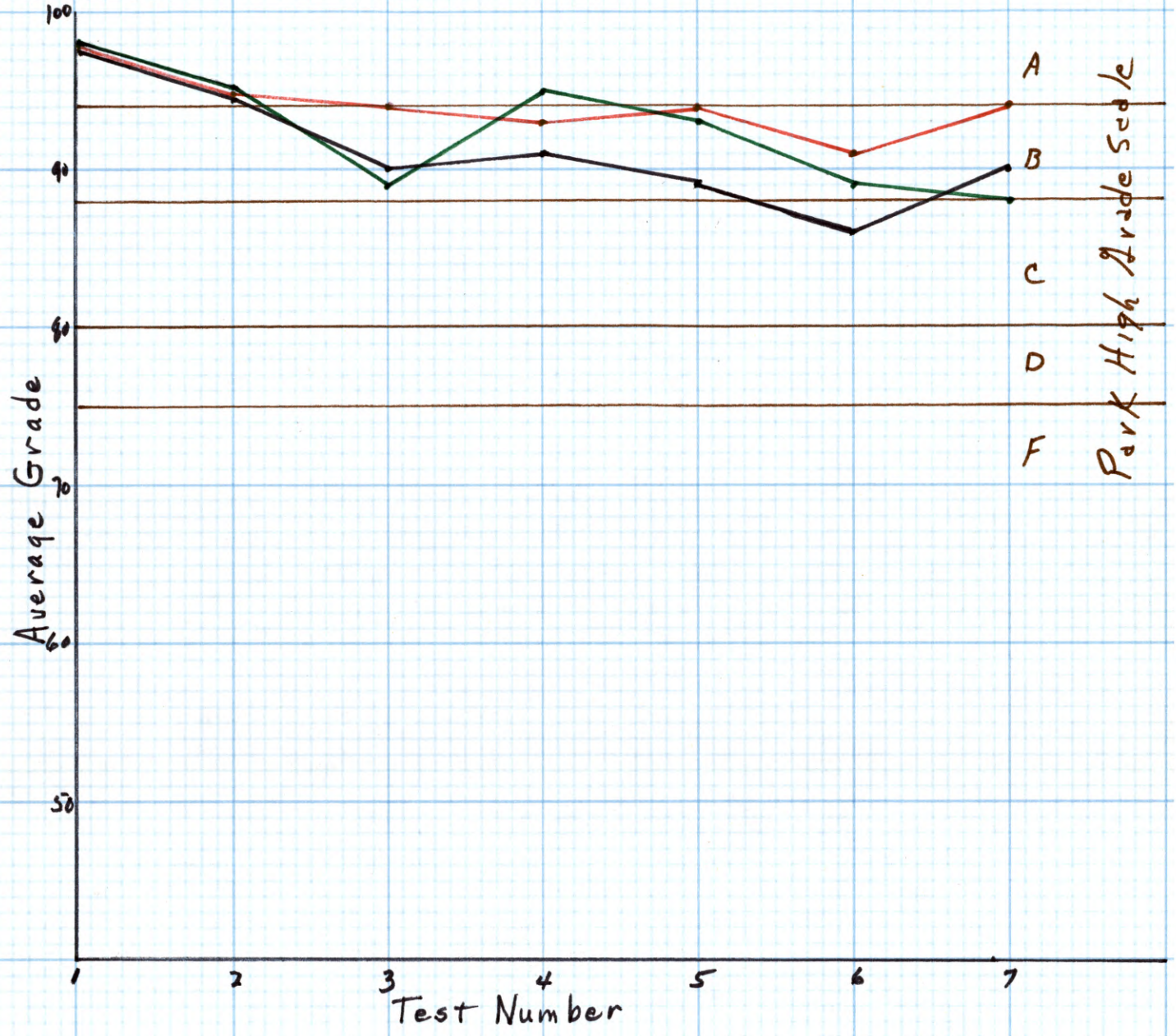

Figure 3 - School Years 1964 and 1965 combined
I.Q. over 120

Seniors
Juniors
Sophomores

could be considered superior to the others. All of the test averages were within the A and B range on the grade scale.

During the school year 1965, the three classes did not score equally well as in the previous year (Figure 2). On test Number 4, the averages varied by 12 points. On test Number 3, the difference was 11 points. On tests Number 6 and Number 7, the difference was ten points. Test Number 5 showed a difference of six points, test Number 2 a difference of four points, and test Number 1 a difference of two points. The sophomores had the highest average or tied for the highest average on five of the seven tests. Not once during the school year 1965 were the test averages of the seniors above those of the sophomores and juniors. The reasons for the seniors being at the bottom of this group would have to be found in their individual records. Many items such as these may be contributing factors: Was the group mostly boys or girls? Were the boys in athletics and missing some days of school? Were there any discipline problems in the group? Were any of the students married or planning to be married soon after graduation? What differences were there in their scholastic background? What grades had they received in other subjects? Did they belong to or take part in many extra-curricular activities? Was there a possibility that their I.Q. scores could be incorrect? And, what did their other test scores indicate? There could be many reasons other than these, of course, but these would act as a guideline.

When the average test scores of the sophomores, juniors, and seniors for the two years, 1964 and 1965 are combined, the difference between the three classes is small (Figure 3). Test Number 7 showed the largest

differential--six points. Tests Number 3, Number 5, and Number 6, showed differences of five points; test Number 4 a difference of four points, and tests Number 1 and Number 2 showed all three classes having the same test average. These differences are so small that no one class could be considered superior to the others. The seniors on test Number 6 had an average of 86, which was the only average below an A or B on the grade scale.

Group 2, I.Q. 110 to 120

The second group of students taking part in this experiment were those who had I.Q. scores between 110 and 120. Forty-two percent of the seniors, 42% of the juniors, and 31% of the sophomores comprised group 2. Their averages on the seven standardized tests can be seen in Figure 4, Figure 5, and Figure 6.

During the school year 1964, the test score averages of the juniors were above the sophomore and senior averages on every test (Figure 4). The greatest difference in their averages occured on test Number 6 where the juniors were six points above the seniors and 15 points above the sophomores. On the other six tests the seniors were within two points of the juniors except on test Number 2 where the difference was only four points. The sophomores, however, scored appreciably lower than the juniors. Test Number 5 showed a difference of ten points, tests Number 3 and Number 7 a difference of six points, and test Number 2 a difference of four points. The sophomores, on test Number 6, had an average of 73 which is an F on the grade scale.

The test averages of the sophomores, juniors, and seniors, during

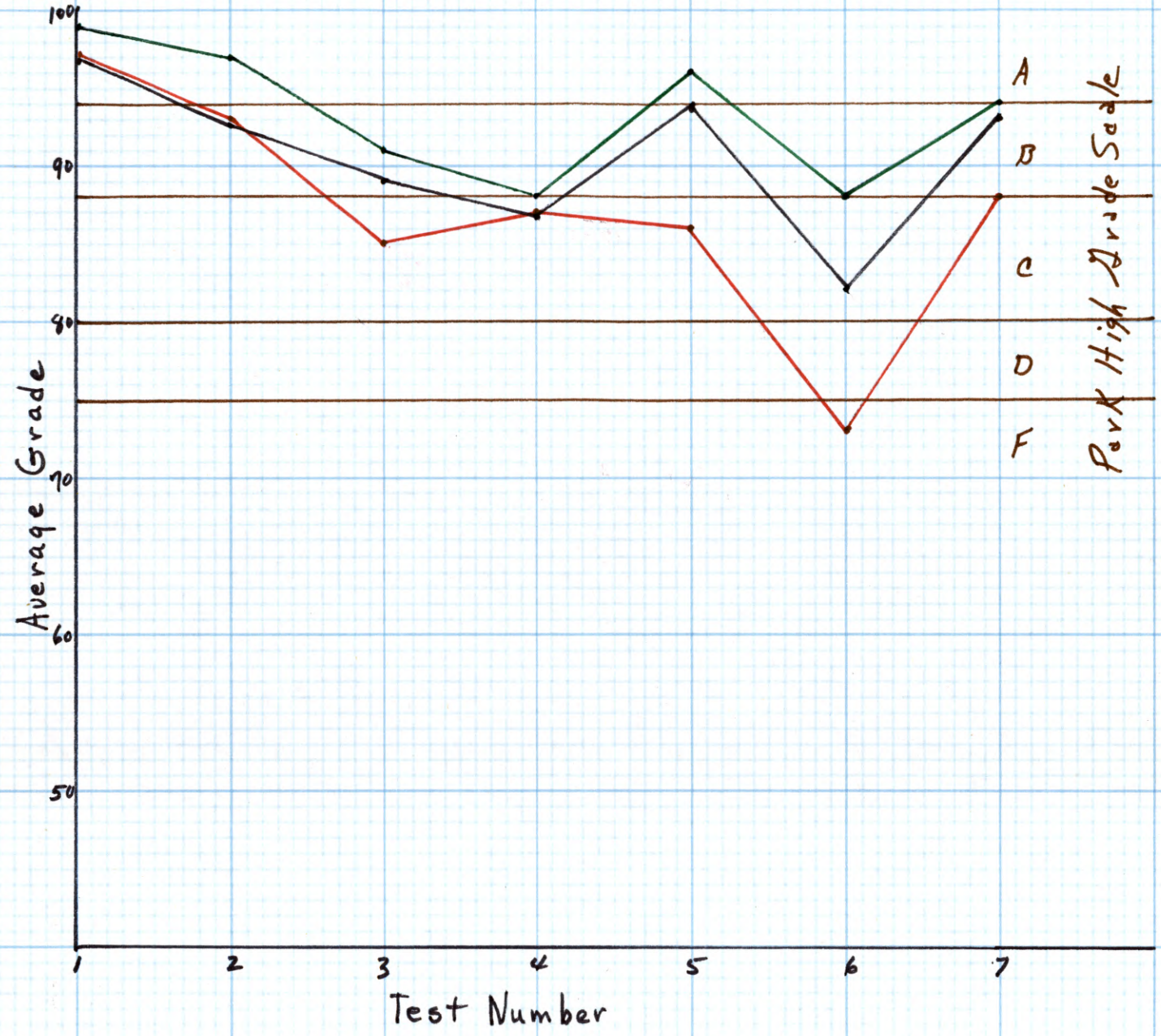

Figure 4 - School Year 1964
I.Q. 110 - 120

Seniors
Juniors
Sophomores

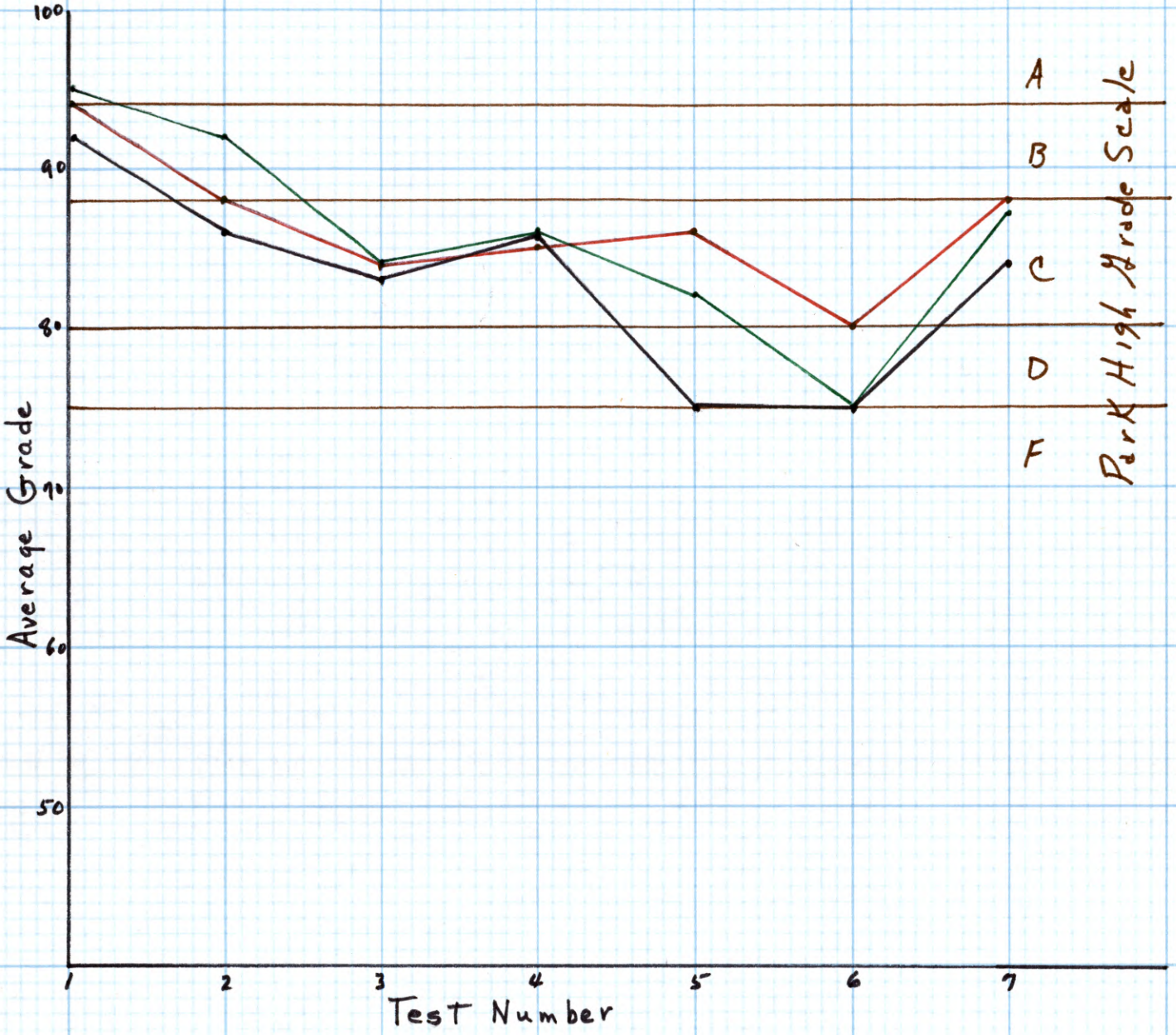

Figure 5 - School Year 1965
I.Q. 110-120

Seniors
Juniors
Sophomores

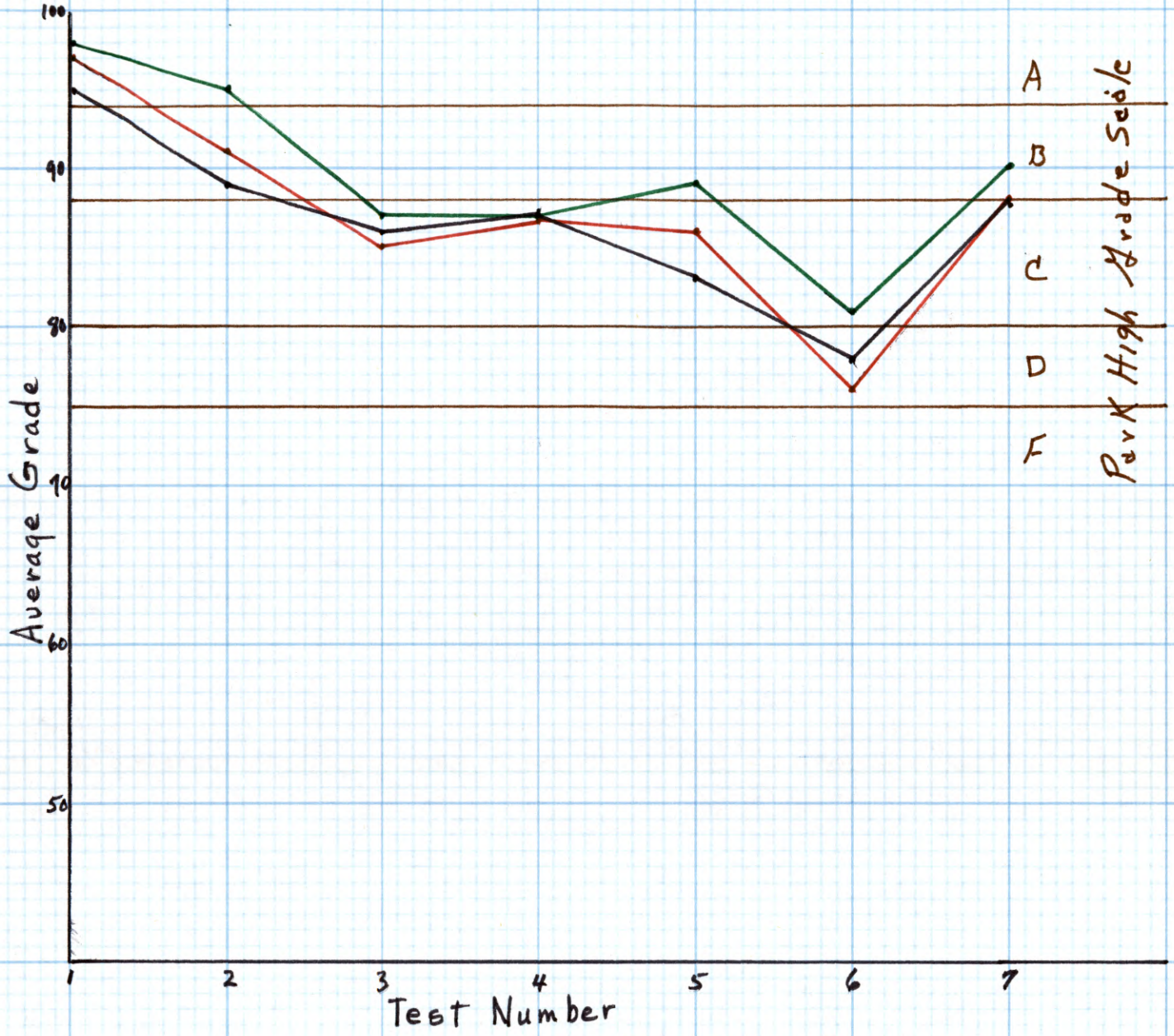

Figure 6-School Years 1964 and 1965 combined
I.Q. 110-120

Seniors
Juniors
Sophomores

the school year 1965, varied by more than six points only once (Figure 5). This was on test Number 5 where the sophomores were four points above the juniors, and 11 points above the seniors. Unlike the previous year, when the sophomore averages were below the junior and senior averages, the school year 1965 showed the sophomores to be consistently higher than the juniors and seniors. The seniors had two test averages and the juniors one test average of 75 which is the lowest passing grade of D on the grade scale.

The test averages of the three classes never varied by more than six points when the two years were combined (Figure 6). This difference is so small that no class could be considered superior to the other two. On test Number 6, the seniors had an average of 78 and the sophomores had an average of 76 which is a D on the grade scale. The largest portion of the test averages were C's and B's on the grade scale.

Group 3, I.Q. 100 to 110

The third group of students in this experiment were those who had I.Q. scores between 100 and 110. Twenty-five percent of the seniors, 26% of the juniors and 29% of the sophomores comprised group 3. Their averages on the seven standardized tests can be seen in Figure 7, Figure 8, and Figure 9.

The school year 1964 showed a big difference in the average test scores of the sophomores, juniors, and seniors (Figure 7). The seniors were definitely superior to the juniors and sophomores. The seniors scored higher than the sophomores on the seven tests as follows: Test 1, four points, test 2, ten points, test 3, 13 points, test 4, 17 points,

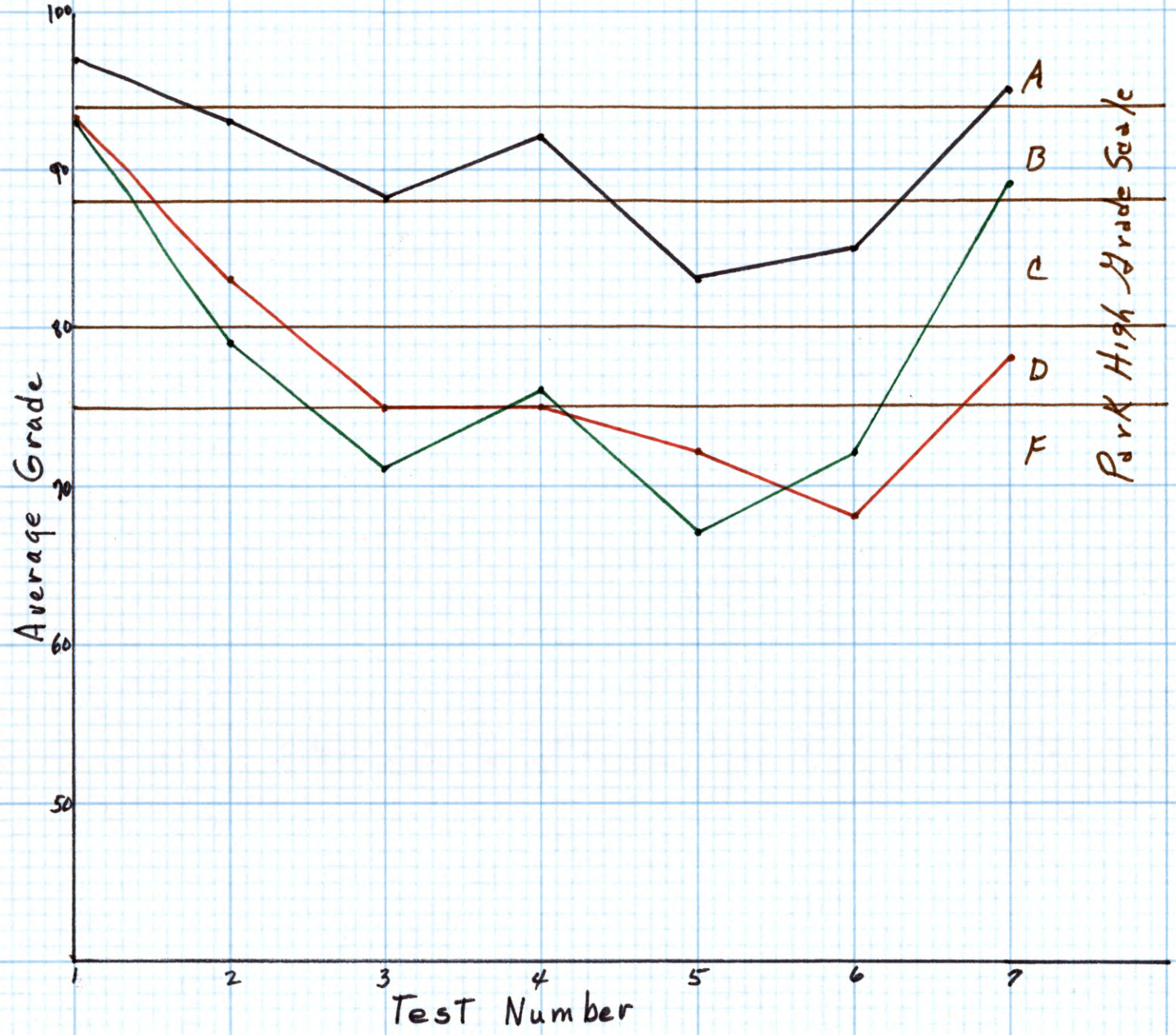

Figure 7 - School Year 1964
I.Q. 100-110

Seniors
Juniors
Sophomores

Figure 8 - School Year 1965

I.Q. 100 - 110

Seniors

Juniors

Sophomores

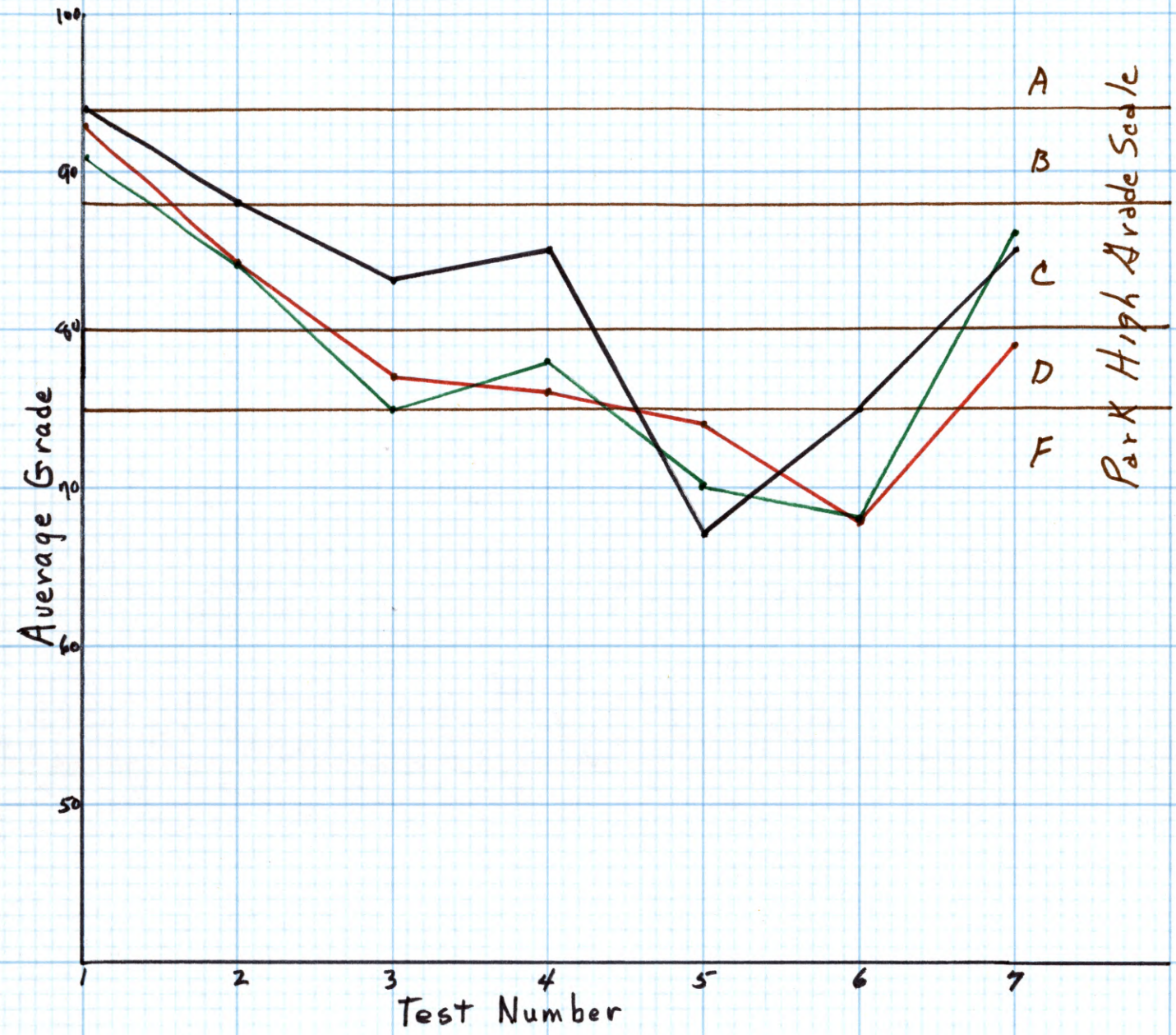

Figure 9-School Years 1964 and 1965 combined
I.Q. 100-110

Seniors
Juniors
Sophomores

test 5, 11 points, test 6, 17 points, and test 7, 17 points. The seniors scored higher than the juniors on the seven tests as shown in the following: Test 1, four points, test 2, 14 points, test 3, 17 points, test 4, 16 points, test 5, 16 points, test 6, 13 points and test 7, six points. During the school year 1964, the seniors definitely showed a superiority over the sophomores and juniors. No senior average was below a C on the grade scale while the sophomores had two grade averages in the F range and the juniors had three test averages in the F range.

The following school year, 1965, showed an opposite result from the school year 1964 (Figure 8). The test averages of the three classes were closer together in this group than in any of the other tested groups. The test averages varied five points on test Number 1, and four points on test Number 5. On the other five tests, the difference was three points or less. There was no major difference shown between the classes in this school year.

When the test score averages for the two years are combined, (Figure 9), the seniors show a trend of being above the sophomores and juniors. The averages on all tests have dropped to the lower part of the grade scale. The sophomore averages show one B, two C's, two D's, and two F's. The junior averages show one B, two C's, two D's, and two F's. The senior averages show one A, one B, Three C's, one D, and one F.

Group 4, I.Q. 90 to 100

The fourth group tested in this experiment were those students whose I.Q. scores were between 90 and 100. Six percent of the seniors, 15% of the juniors, and 22% of the sophomores comprised group four. Figure 10,

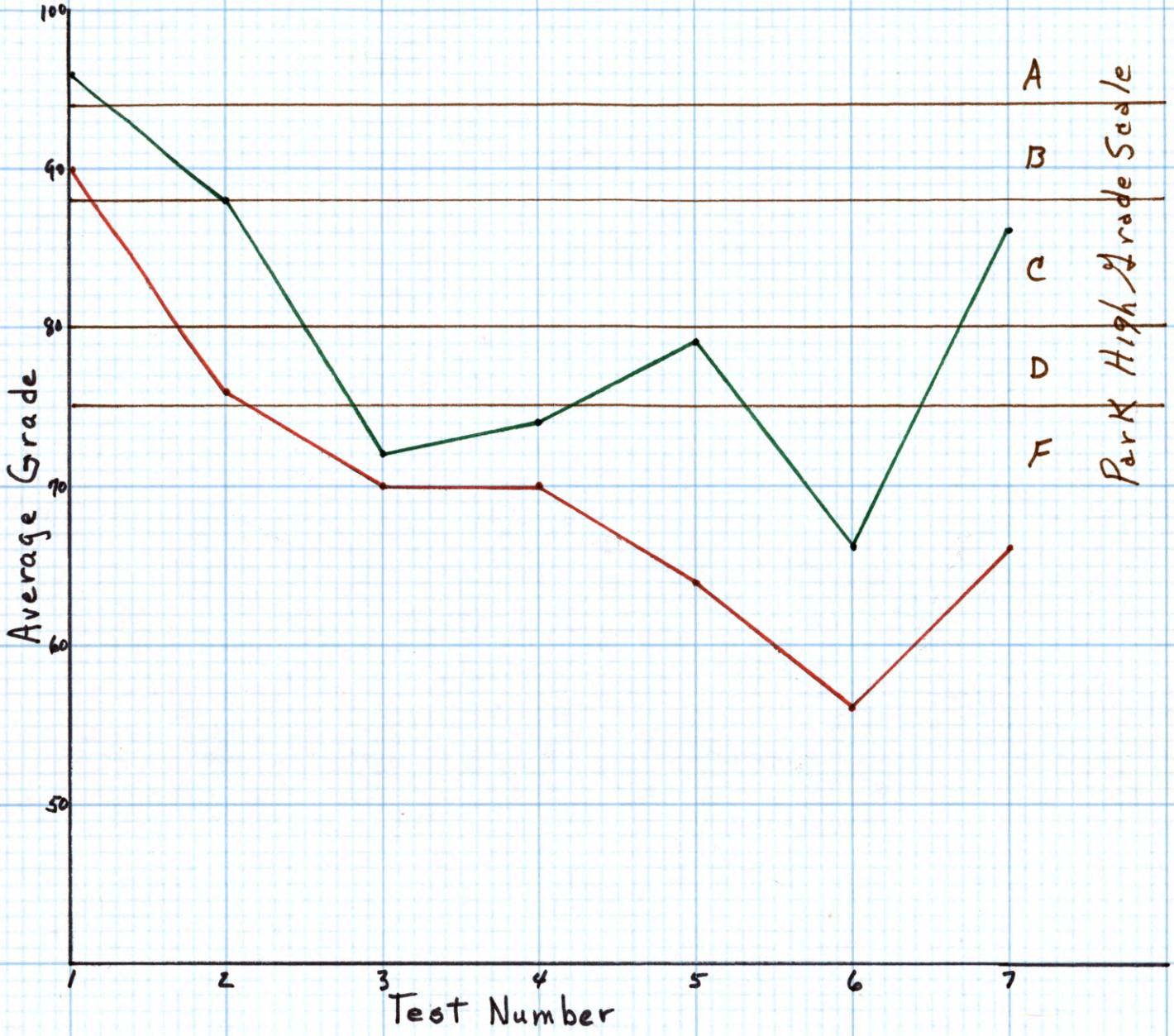

Figure 10 - School Year 1964
I.Q. - 90 - 100

Seniors
Juniors
Sophomores

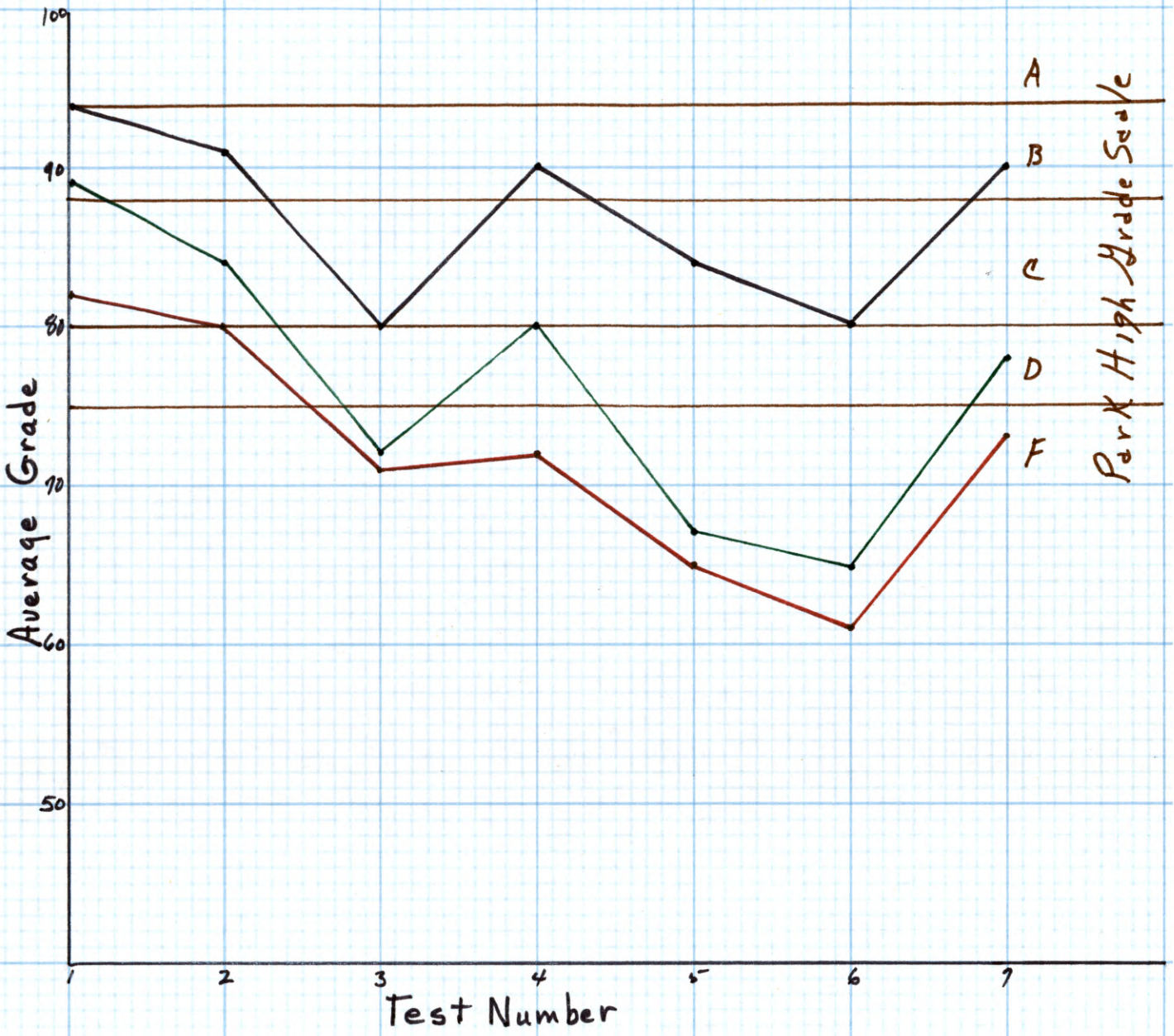

Figure 11 - School Year 1965
I.Q. 90-100

Seniors
Juniors
Sophomores

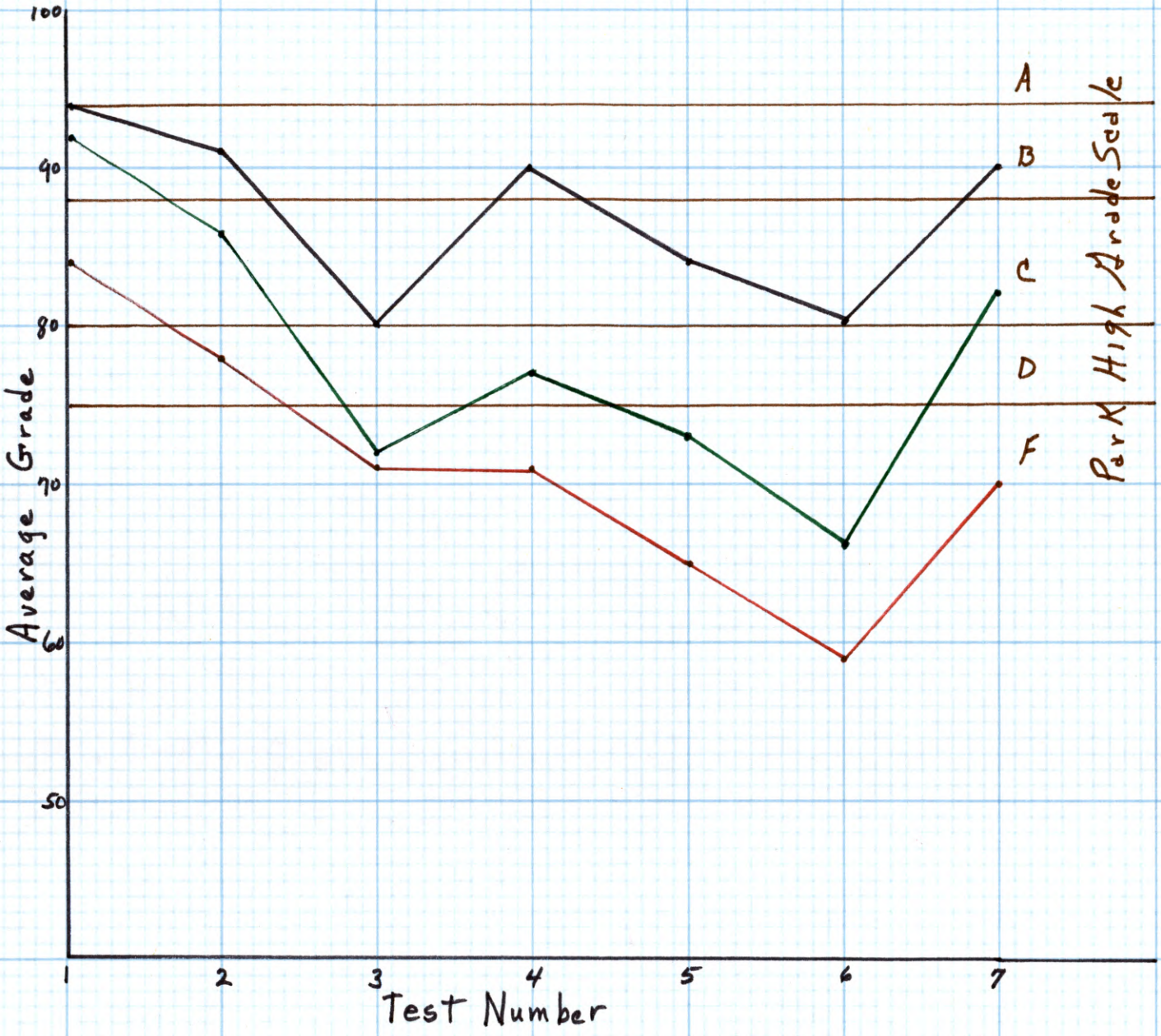

Figure 12 - School Years 1964 and 1965 combined
I.Q. 90-100

Seniors
Juniors
Sophomores

Figure 11, and Figure 12, depict the average test scores of this group.

During the school year 1964, there were no seniors enrolled in bookkeeping with an I.Q. in this range (Figure 10). The juniors showed a definite superiority over the sophomores on all seven tests. The differences in their test score averages ranged from two points on test Number 3 to 20 points on test Number 7. The sophomore test averages were in the F grade on five of the seven tests while the juniors had three of their test averages in the F grade.

The sophomores again had five test averages in the F grade, during the school year 1965, and juniors had three (Figure 11). The junior's test averages were above those of the sophomores on all seven tests ranging from one point on test Number 3 to eight points on test Number 4. The seniors in this group were definitely above the sophomores and juniors. All of the senior test averages were in the B and C grade range with no test average below 80. The senior test averages exceeded the junior test averages from five points on test Number 1 up to 18 points on test Number 5.

The same superiority of the seniors above the juniors and the juniors above the sophomores was true when the two years, 1964 and 1965, were combined (Figure 12). The test averages show that the typical sophomore or junior with an I.Q. of 90 to 100 will not have an easy time obtaining passing grades in the bookkeeping course. The seniors, however, can and do get passing grades. There could be several factors which would make this true. Perhaps the seniors by this time in their school life had established study habits and a desire for learning greater than the

sophomores or juniors. Perhaps after being in school two years longer than the sophomores and one year longer than the juniors and having taken other courses in the curriculum, the seniors had a background of knowledge that helped them understand the bookkeeping process better. Perhaps being two years older than the sophomores, some of the seniors may have had jobs where they became acquainted with the business process, thus making their understanding easier. Or, perhaps the low achievers in this I.Q. group have dropped out of school by this time in their school life. There could, of course, be many other factors.

Group 5, I.Q. below 90

The fifth group of students in this experiment were those who had I.Q. scores below 90. Six percent of the seniors, two percent of the juniors, and ten percent of the sophomores comprised gourp 5. Their test averages are shown in Figure 13, Figure 14, and Figure 15.

During the school year 1964, there were no juniors or seniors enrolled in bookkeeping with an I.Q. below 90 (Figure 13). The sophomores in this group scored very low. On test Number 1, their average was 83, on test Number 2, 76, on test Number 3, 66, on test Number 4, 68, on test Number 5, 57, on test Number 6, 59, and on test Number 7, 74. The last five test averages were an F on the grade scale.

The sophomores, during the school year 1965, had test averages very similar to their test averages of the school year 1964. Five of their averages were an F on the grade scale. The juniors had passing test score averages on all tests except on test Number 5 and 6 where they

Figure 13 - School Year 1964
I.Q. under 90

Seniors
Juniors
Sophomores

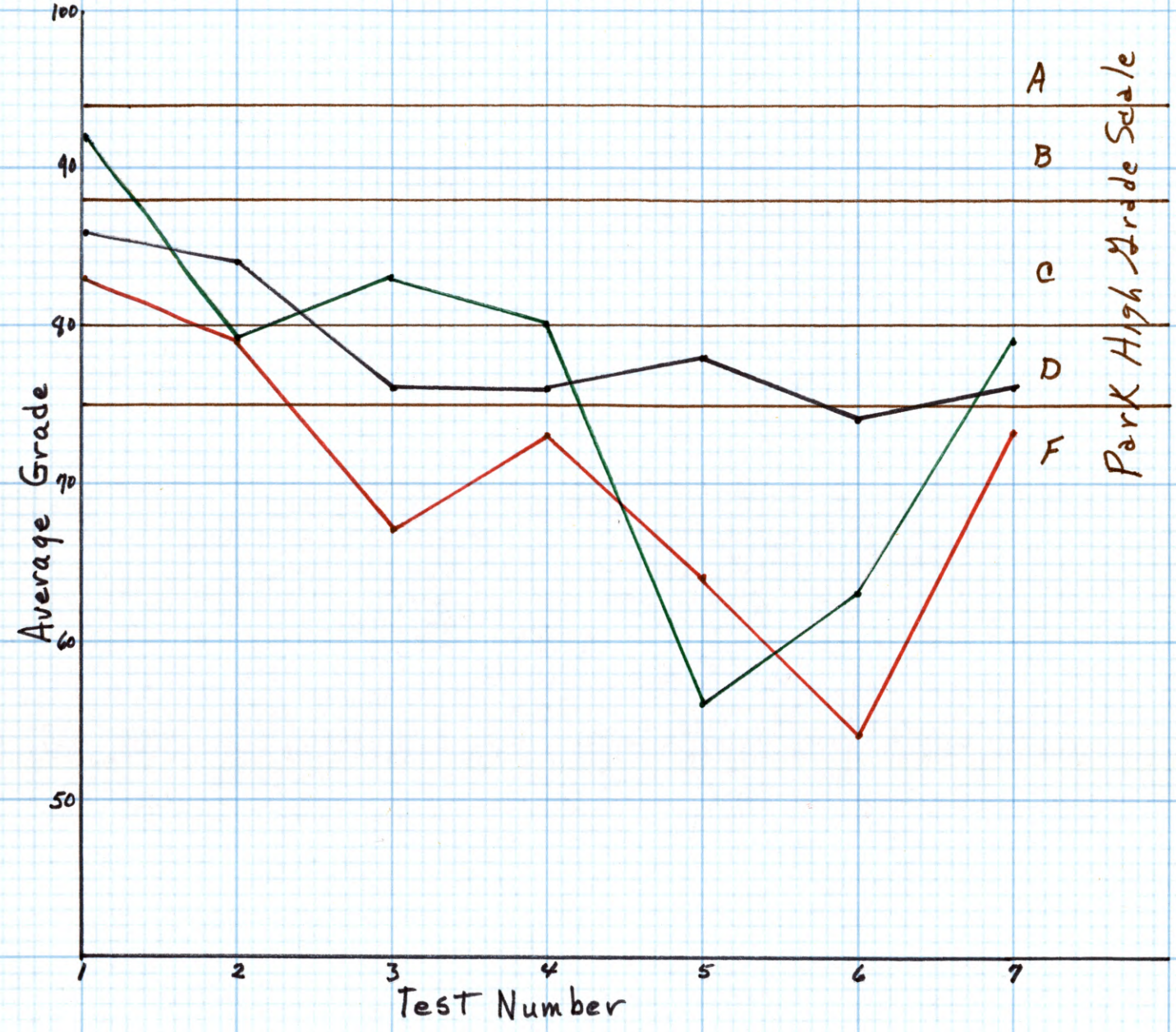

Figure 14 - School Year 1965
I.Q. under 90

Seniors
Juniors
Sophomores

Figure 15 - School Years 1964 and 1965 combined
I.Q. under 90

Seniors
Juniors
Sophomores

dropped into the F grade. The seniors had passing test score averages on all tests except on test Number 6 where they missed a D grade by one point.

The combining of the two school years 1964 and 1965, again shows the sophomore's test averages to be mainly in the F grade. The juniors dropped into the F grade on tests Number 5 and 6 but had passing test averages on the other five tests. The seniors were the most consistent. Their high test average was only 12 points above their low test average, and all were passing grades except where they missed a D by one point.

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APPENDIX

TABLE I, SENIOR I.Q. SCORES AND STANDARDIZED TEST SCORES

Student No	I.Q.	Tests						
		1	2	3	4	5	6	7
1	83	83	97	94	86	88	82	80
2	85	76	74	67	67	68	67	72
3	94	92	90	77	84	75	65	86
4	98	96	93	83	96	94	94	94
5	102	99	94	91	93	95	95	97
6	102	84	73	72	63	66	44	83
7	103	80	75	72	70	47	41	54
8	105	99	93	99	92	79	88	87
9	105	100	88	71	90	80	85	75
10	105	92	89	84	82	89	73	85
11	107	100	91	81	86	67	87	92
12	108	92	89	81	89	74	61	92
13	108	99	98	99	99	98	99	98
14	110	93	89	79	96	80	80	95
15	110	100	93	87	92	83	90	88
16	110	92	86	68	80	78	63	87
17	111	100	99	85	91	98	95	95
18	112	93	93	84	86	88	85	90
19	113	100	98	100	98	95	90	94
20	113	98	86	77	69	52	63	85
21	113	58	81	71	83	49	52	78
22	113	100	96	97	95	97	80	97
23	113	100	93	98	91	94	79	92

TABLE I, CONTINUED

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
24	115	96	91	94	86	97	85	91
25	115	99	78	72	82	64	68	66
26	117	97	64	93	77	74	59	75
27	118	96	94	89	96	91	93	90
28	118	97	93	90	82	98	93	96
29	120	93	88	81	77	73	63	79
30	121	97	94	81	90	94	85	78
31	122	100	96	94	96	97	87	87
32	123	100	98	98	100	97	93	96
33	124	100	96	95	99	96	91	96
34	129	97	94	84	84	67	81	90
35	133	98	95	87	82	91	92	97
36	134	100	98	98	97	98	95	95

TABLE II, JUNIOR I.Q. SCORES AND STANDARDIZED TEST SCORES

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
1	88	92	79	83	80	56	63	79
2	91	89	90	78	87	58	77	86
3	94	92	89	67	71	82	63	82
4	98	98	86	70	93	87	67	89
5	99	81	78	69	62	58	53	60
6	99	97	83	63	70	66	70	87
7	99	98	93	86	81	88	65	88
8	100	90	83	68	68	48	27	87
9	103	89	76	60	74	52	49	87
10	104	91	69	71	64	53	74	87
11	104	92	91	88	82	86	88	83
12	104	93	83	78	92	81	84	95
13	104	78	73	61	71	58	57	77
14	105	98	93	81	89	97	94	93
15	105	94	84	71	74	76	73	88
16	107	93	91	85	86	71	78	90
17	108	87	85	81	93	70	65	90
18	109	92	93	78	66	82	63	70
19	110	100	98	89	95	97	91	97
20	111	97	91	86	91	70	79	89
21	111	91	88	76	74	92	61	79
22	112	97	89	77	82	81	69	84
23	112	97	93	90	81	91	72	97

TABLE II, CONTINUED

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
24	112	100	96	93	98	99	94	96
25	112	93	100	90	94	95	93	93
26	113	100	94	91	92	97	83	98
27	113	98	99	84	94	70	90	95
28	113	89	93	77	83	86	65	87
29	115	100	93	90	89	79	75	79
30	115	98	89	83	98	79	75	89
31	115	100	98	92	97	96	90	94
32	115	99	99	95	70	97	91	90
33	115	100	98	97	89	95	88	94
34	116	100	95	81	66	92	77	91
35	119	99	96	93	88	94	90	86
36	120	100	89	79	84	81	91	82
37	122	94	94	94	96	95	88	82
38	123	99	94	88	99	99	97	94
39	124	98	100	100	99	99	90	94
40	128	99	95	76	91	84	76	82
41	135	99	99	99	99	99	95	95

TABLE III, SOPHOMORE I.Q. SCORES AND STANDARDIZED TEST SCORES

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
1	74	74	83	76	86	75	68	85
2	76	80	88	73	87	77	59	87
3	78	88	76	63	81	61	52	70
4	81	73	64	54	53	40	36	59
5	83	94	89	75	78	70	55	77
6	85	91	75	69	58	71	47	77
7	87	98	88	79	74	61	64	63
8	88	84	55	47	67	22	70	75
9	88	62	73	64	54	56	44	66
10	88	90	86	--	71	76	62	76
11	90	99	91	74	83	70	60	--
12	91	83	62	41	53	37	54	33
13	92	63	66	69	57	67	38	63
14	92	72	72	67	43	52	27	41
15	92	89	65	75	47	58	45	66
16	92	82	90	82	67	74	62	84
17	93	92	95	83	97	89	85	90
18	95	71	69	54	44	66	44	74
19	96	96	96	86	93	82	87	89
20	96	51	65	62	82	42	47	66
21	96	80	66	63	87	55	39	63
22	96	91	71	62	71	45	39	76
23	97	86	85	74	57	70	59	87

TABLE III, CONTINUED

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
24	97	88	86	72	78	49	67	81
25	97	91	91	78	87	66	90	92
26	97	99	86	83	90	88	74	75
27	98	89	79	70	73	74	58	59
28	98	90	58	59	51	60	39	63
29	98	88	81	63	70	62	56	82
30	98	96	85	95	84	83	81	91
31	99	99	74	86	78	98	78	97
32	100	88	85	72	59	68	48	58
33	100	88	65	57	61	47	43	41
34	101	97	89	88	88	75	62	66
35	101	93	95	75	71	59	60	--
36	102	97	83	81	87	84	77	89
37	102	91	73	74	63	74	69	88
38	102	98	90	75	84	66	71	76
39	102	93	95	65	83	83	74	66
40	102	96	90	74	78	95	85	90
41	102	90	48	63	60	45	54	79
42	104	98	98	90	76	83	86	83
43	105	84	83	76	67	64	45	74
44	105	100	95	82	88	83	82	72
45	105	93	78	79	75	69	85	96
46	106	98	95	83	74	90	72	88

TABLE III, CONTINUED

Student No.	I.Q.	Tests 1	2	3	4	5	6	7
47	106	94	63	76	58	82	61	77
48	107	100	98	99	97	90	95	92
49	107	92	89	78	77	79	78	84
50	107	100	96	86	91	98	91	99
51	107	100	94	91	82	73	76	96
52	108	80	63	56	67	54	45	63
53	108	80	76	71	59	57	57	73
54	109	99	96	85	90	92	95	93
55	109	94	96	78	88	67	65	79
56	109	86	78	72	61	63	46	66
57	109	92	78	69	77	58	52	73
58	109	98	94	76	84	76	50	89
59	109	97	80	79	88	84	77	90
60	110	93	79	72	70	77	53	74
61	110	98	95	72	86	81	56	87
62	111	97	84	80	57	80	61	81
63	112	99	91	95	97	95	97	92
64	112	94	83	72	76	73	63	84
65	112	91	88	85	94	96	84	92
66	112	93	88	77	96	79	86	89
67	112	98	93	84	89	89	83	79
68	113	94	95	77	93	95	87	93
69	113	100	95	85	93	99	94	96

TABLE III, CONTINUED

Student No.	I.Q.	Tests						
		1	2	3	4	5	6	7
70	113	97	93	75	77	86	62	91
71	113	89	89	78	87	80	86	83
72	114	100	98	92	94	94	82	95
73	114	99	98	99	94	98	94	94
74	114	96	90	98	93	94	90	93
75	114	99	99	99	100	96	89	99
76	114	100	93	93	99	98	92	92
77	115	96	95	79	80	73	43	70
78	115	93	89	79	66	62	56	87
79	115	92	89	83	93	83	86	83
80	115	94	60	64	82	68	49	73
81	116	96	95	81	78	65	60	68
82	116	100	88	86	82	88	72	88
83	117	100	99	98	99	100	100	100
84	117	100	95	84	71	79	63	93
85	117	100	98	99	97	99	97	98
86	118	98	95	83	91	96	94	93
87	118	96	95	90	81	79	81	95
88	119	100	99	100	98	98	98	100
89	119	96	83	78	82	68	67	82
90	120	97	95	98	100	92	99	98
91	122	100	99	97	96	96	96	94
92	123	99	94	91	86	93	91	95

TABLE III, CONTINUED

Student No.	I.Q.	Tests 1	2	3	4	5	6	7
93	124	100	98	100	100	98	100	98
94	125	100	98	85	84	95	83	92
95	125	96	90	94	91	91	87	96
96	130	98	93	92	91	89	92	95
97	134	97	94	94	96	96	84	86