Measuring Handwriting Variables

How to move around in this document:

Click on any page's Footer to **Go to Report Sheet**.

Once there,

click on “**Variables**”

to go to the first page of descriptions, or

click on a **number**

to see its description.

A NEW DICTIONARY FOR MEASURING HANDWRITING VARIABLES, OPERATIONALLY DEFINED

Tom Kimball, Ph.D., M.G.A.

created this dictionary

of trait descriptions

to facilitate data analysis

for his doctoral research in 1973.

Included are 82 reliable descriptions

familiar to both Graphoanalysts and graphologists.

Measuring Handwriting Variables

A LOGICAL ORDER FOR MEASUREMENT OF HANDWRITING VARIABLES, OPERATIONALLY DEFINED

Definitions: Middle Zone Letters: lower-case a, c, e, I, m, n, o, r, s, u, v, w, x, and all digits;

Upper Zone Letters: lower-case b, d, f, h, k, l, t;

Lower Zone Letters: lower-case f, g, j, p, q, y, and z; (Note – f appears twice.)

Ascender: stroke higher than average Middle Zone formations;

Descender: stroke below the baseline; (Note – both ascenders and descenders must come from the baseline.)

Capital: upper-case letters; classify as Upper Zone Letters, unless written with a Descender, as in some G, J, P, Y, Z capitals – classify such exceptions as Lower Zone Letters.

Instruments: Protractor, clear plastic;

Straight-edge, marked in millimeters, clear plastic;

Pencil with fine point;

Desk-sized calculator;

Graphoanalysis Slant Gauge, or facsimile of clear plastic.

Measuring Handwriting Variables

Variable No. & Name **Average Measurement Time**

1. **Width of the Top Border**. Measure the distance vertically from the top edge of the paper to the uppermost point of the first word of the first line. Repeat for the last word of the first line. Average the measurements. (See Report Sheet for desirable accuracy of measurement values.) Time: (not available)
2. **Width of the Bottom Border**. Measure the distance vertically from the distance vertically from the bottom edge of the paper to the lowest point of the first word in the last line of writing. Repeat for the last word of the last line. Average the results. (NA)
3. **Left Border Width**. Measure the horizontal distance from the left edge of the sheet to the farthest left point of each writing line (except the first); sum the measurements and take their average. Time: ##3 + 4 (2'44”)
4. **Right Border Width**. Perform the same measurements as for the left border on the right side; this time, however, include the first line, but ignore the last line.
5. **Paragraph Indenture**. If the indenture of the **first** line exceeds that of the **third** line, paragraph indenture will be considered to have taken place. If this is not the case, the measurement value assigned will be zero. If there is indenture, measure its depth (width) horizontally, taking the distance between the farthest left point of the first line and the farthest left point of the second line. Average results for more than one indenture. (NA)
6. **Distance between Words**. Begin with the farthest left point of the

first word of the first line and measure to the last point at the right of the first line **before any punctuation appears**. Measure each word in the above interval and sum. Take the difference between these two sums, and divide it by the number of spaces between words in the interval. Repeat this procedure for each line, and average the results. (14')

7. **Word Distance Span**. Examine the specimen as a whole for the largest and smallest spaces between consecutive words in which no punctuation mark appears (measuring as many spaces between words as necessary) and take the difference between them. Confine measurements to the Middle Zone. (3'44:)
8. **Distance between Lines**. Measure the vertical distance* from the baseline of the first word of the first line to the baseline of the first word in the last complete line, at the left side of the script. Repeat for the right side of the script. Average the two and divide by the number of spaces between the lines. *(Left side: measure between the points where the first stroke touches the baseline; right side: measure between the points where the last stroke touches the baseline.)

The **baseline** is constructed thus: disregarding descender strokes of lower-zone letters, adjust a straight-edge to the lowest point of other strokes in the line of writing; connect three or more consecutive points that lie in a straight line, using a fine pencil point; in any word, draw the longest lines first, then the shorter ones; through those lowest point no so included, draw lines parallel to adjacent baselines within the same

word. One baseline per word is more desirable, even it it slightly cuts through some lower strokes while running tangent to most. (2'29”)

9. **Inclination of the Writing Lines**. Draw straight lines through the beginning baseline point and the ending baseline point of each complete line, extending them to the left edge of the sheet. Using a protractor, measure inclination in degrees from the horizontal; call them “+” if they incline toward the top of the sheet, and “-” if they decline toward the bottom of the sheet. Average the results. Retain maximum and minimum values to compute #10.

##9 + 10 (6'57”)

10. **Span of Inclination**. Take the angle between the most ascending and the most descending lines.
11. **Total Loopiness**. Count all the white spaces entirely surrounded by the writing line in all the words, and divide by the total number of letters. (This means to count all looped l's, t's, g's, y's, etc.–all loops appearing in any place.) (3'20”)
12. **Upper Zone Loopiness**. Count the number of white spaces entirely surrounded by the writing line in the upper zone or ascenders of the upper-zone letters and divide by the number of upper-zone letters in the specimen. (1'47”)
13. **Lower-Zone Loopiness**. Count the number of white spaces entirely surrounded by the writing line in the descenders of the lower-zone letters, and divide by the number of lower-zone letters. (59”)
14. **Middle Zone Loopiness**. Take the sum of the upper-zone loops and the lower-zone loops, and subtract this from the total loops;

divide by the total number of letters (increased by the number of lower-case f's), less the number of upper-zone and lower-zone letters in the specimen. (1'13”)

15. **Loop Shape.** First, to clarify “height” and “width,” imagine that the slant of the writing where each loop occurs has been adjusted to be perpendicular to the baseline (see #65—**Slant**). Now examine only every (N/10)th word (e.g., in a specimen of 70 words, count every 7th word), and measure the height of each loop* and divide it by the width. Classify each loop-ratio as follows:
(1) Narrow: greater than 4.5;
(2) Broad: 4.5 to 1.0, inclusive;
(3) Exaggerated: less than 1.0
Average the results. *(Ignore loops or looped hooks within the main loops and circle formations of the Middle Zone; if the word has no loops, take an adjacent word, but resume counting after the (N/10) word.) (2'55”)
16. **Balance of Loops**. Count the lower-case f's made as follows and divide this sum by the total number of lower-case f's in the specimen: (a) the first stroke of the upper loop must start forward (right) from the baseline, turning to the left at the apex of the loop; (b) following the downstroke through the baseline, the final stroke of the lower loop must move forward (right) and upward and then across the main stem; (c) this final loop stroke must move forward (right) and upward and then across the main stem; (d) this final loop stroke must be followed by a short terminal stroke moving forward and upward; (e) the upper loop must appear

equal in size to the lower loop. (57″)

17. **Tie Strokes**. Count each tie stroke: i.e., each upstroke which departs from a downstroke, moves in a backward (left) direction, loops and returns across itself and the downstroke. Divide by the total number of letters. ##17 + 18 (1'55″)
18. **Figure "8" Strokes**. Count the stroke formations (e.g., f, g, gh) which appear to be a figure "8" made with one continuous stroke. Divide by the total number of letters in the specimen.
19. **Lower-looped p**. Count each lower-case p made with a looped descender. Divide the sum by the total number of lower-case p's. ##19 + 20 (1'3″)
20. **High p-stem**. Count each lower-case p (with or without a leader) [initial stroke] whose stem begins at a point higher than is reached by the following upstroke. Divide the sum by the total number of lower-case p's.
21. **Absence of Leaders**. Disregarding the letters a, c, d, g, o, q, and all capitals, count each initial stroke-formation whose first downstroke lacks the usual upstroke (leader). Divide this sum by the number of initial strokes, less t-bars, x-bars, hyphens, i-dots, and j-dots. (4'47″)
22. **Initial Hooks**. Count the number of initial strokes (except i-dots, j-dots, or c's without leaders) which form a hook (incomplete loop, more "c"-shaped than "u"-shaped). Divide by the total number of initial strokes, less i-dots, j-dots. ##22 +23 (2'52″)
23. **Final Hooks**. Count the number of final strokes which form a hook (incomplete loop, more "c"-shaped than "u"-shaped). Divide by the

total number of final strokes, less i-dots, j-dots.

24. **Initial Upper Zone Strokes, "Fluid"**. Count each initial downstroke which begins in the upper zone and blends smoothly (without an angle—more "S"-shaped than "c"-shaped) into the downstroke which reaches the baseline. Divide by the total upper-zone initial strokes which touch the baseline. (49")
25. **"Angles" Initial Strokes**. Count each short initial stroke ("tick") which begins above the baseline and connects with the following stroke at a sharp angle. Divide by the total initial strokes which touch the baseline (i.e., less t-bars, hyphens, i-dots, j-dots). (1'13")
26. **Straight Initial Strokes, Middle/Lower Zones**. Count each straight initial upstroke which begins at or below the baseline, appearing to brace rigidly the structure following. Divide by the total number of initial upstrokes (leaders) which begin in the middle or lower zones. (1'29")
27. **Initial Loop, Left-to-right**. Count each initial loop in which the stroke starts left, goes up and right, crossing itself as it goes down to the baseline*. Divide by the number of initial strokes, less t-bars, x-bars, i-dots, j-dots, and hyphens. *(This pattern may be rotated as a whole, relative to the baseline, providing the stroke is made in a counterclockwise direction, and closes the loop before coming down to the baseline. Ignore un-based loops, as in the t-bar of capital T.) (41")
28. **Descenders with Small Loop**. Count each descender (especially in letters g, j, y) which ends in a small (no larger than the area of

middle-zone letters near it) circle or squarish loop and does not return to the baseline. Divide by the total number of descenders, looped or unlooped. (38″)

29. **Descenders, Unlooped.** Count the number of descenders which are not hooked, looped, nor retraced in lower-zone letters, and divide by the number of descender letters in the specimen (see ##13, 22). (39″)
30. **“Hair-pins”**. Count upper stems made double without loops or retracing, found especially in letters d, h, k, l, and t. Divide by the total number of upper-zone letters. (45″)
31. **Ascenders, Unlooped**. Disregarding “hair-pins” (#30), count the number of ascenders which are both unlooped and unretraced in upper-zone letters. Divide by the number of upper-zone letters in the specimen. (42″)
32. **Line Overlap**. Count the times when an ascender in any line touches the line above, or when a descender in any line touches the line below. Divide this sum by the total number of lines, less one. (54″)
33. **Legibility**. Evaluate each illegible word as zero, each partly-legible word as 0.5, every legible word as 1.0. Average the results, and report as percent. (35″)
34. **Line Fillers**. When long final strokes appear at the ends of lines of writing, or when dashes or lines are used to fill space in lines of writing where a sentence ends short of the right border, count the lines so filled and divide by the total number of lines of writing on the page. (3″)

35. **Connectors between Words**. Count the number of places where two words are joined without lifting the pencil or pen. Divide by the number of intervals between words (i.e., the number of words minus the number of lines). (22″)
36. **Disconnectedness**. Count the number of times the writer breaks the writing line **within** words. Divide the result by the total disconnections possible, assuming this to one break between each letter, with the works, or the number of letters less the number of words. (See Report Sheet for formula.) ##21 + 36 (4'47″)
37. **Pressure (Depth)**. Rate the specimen as a whole from 1 to 6, by comparison with a depth-exemplar. If doubtful, choose the lower of two ratings. For this study, the exemplar consisted of the same word from the specimen (“length”) written six times in a column on the tope sheet of six sheets of the same typing paper, using the same type of pencil as those used by the subjects. The six words varied from very light pressure (1) to very heavy pressure (6). (45″)
38. **Stroke Endings, Blunt**. Count the number of strokes (except t-bars) whose ends do not taper off to nothing, but rather are blunt. Divide by the total number of stroke endings, less i-dots, j-dots, and t-bars. (See formula on Report Sheet.) (1'54″)
39. **Stroke Endings, Straight**. Count the number of blunt strokes which go straight* down, ending at or below the baseline. Divide by the total number of stroke endings, less i-dots and j-dots.
*(i.e., uncurved and virtually parallel with adjacent downstrokes) ##39 + 40 (1'15″)

40. **Stroke Endings, Heavy**. Count the number of blunt strokes (unlooped) which descend below the baseline and which are made with heavy pressure, greater than that for most other strokes in the specimen. Divide by the total number of unlooped descenders in the writing.
41. **High Final Strokes**. Count each up-curved final stroke* which is higher than the preceding middle-zone letters. Divide by the number of final strokes in the whole specimen, less i-dots and j-dots. *(It must come from the baseline.) ##41 + 42 (54”)
42. **Final Backstrokes**. Count each final stroke which curves upward and left, over at least one preceding letter-formation, especially found in t-crossings (It must come from the baseline.) Divide by the total number of finals in the whole specimen, less i-dots and j-dots. Classify all finals (except i-dots and j-dots) into #41 or #42, if they are up-curved.
43. **Stroke Formations Tapered to the Right**. Count each letter m, n, w, u, v, y in which each successive “hump” or “point” is smaller and lower (relative to the baseline) than those preceding, without losing legibility and identity of the letters involved. Sum these, and divide by the total number of m's, n's, w's, u's, v's, and y's in the specimen. ##43 + 44 (2'9”)
44. **Stroke Formations Tapered to the Left**. Count each letter m, n, w, u, v, y in which the final section or “hump” extends higher than the rest of the letter. Tabulate results as in #43, above.
45. **Retrace/”Break-away” Strokes**. Examine each upstroke of formations like b, h, k, m, n, p, r, t, g, j, y: evaluate it as (1) if it comes up left of the previous downstroke, enclosing space between.

Evaluate it as (2) if it retraces the previous downstroke for at least half the height of the upstroke. If it retraces less than half the height of the upstroke, evaluate it as (3). If it departs obliquely (toward the right) from a downstroke in the same letter and is **above the baseline**, evaluate it as (4). If it departs obliquely (toward the right) from a downstroke **below the baseline** (in the same letter), evaluate it as (5). Average the results.

(3'10")

46. **Stroke Formation, Top-Shape**. Examine the shape of the tops of each letter r, m, n, h, k, s, b, p. Rate each according to this classification, and average the results: (37")

    (1) inverted V-shape with some retrace near apex
    (2) inverted V-shape with no retrace
    (3) inverted V-shape with rounded point
    (4) rounded arch with no clear apex
    (5) straight line, either parallel to baseline or slanted.

47. **Greek-style Formations**. Count each letter e or r which resembles a lower-case Greek epsilon (ε). Count each letter d which resembles a lower-case Greek delta (δ). Divide by the total numbers of e's, r's, and d's. (4'56")

48. **Circle Letters, Open**. Count each circle formation (letters a, d, g, o, q) where the circle portion is not completely closed; i.e., the upper left portion does not touch the upper right portion of the structure. Divide by the total number of circle structures. (1'30")

49. **Circle Letters, Clean**. Disregarding whether it is open or closed, classify each circle formation as follows, and average the results:

(1) no inner loops or hooks,
(2) final stroke (right half of structure) is looped,
(3) initial stroke (left half of structure) is looped,
(4) double hook (hook and loop) in initial stroke-form, or
(5) double loops. (2'28″)

50. **T-Stems/D-Stems, Retraced or Not**. Evaluate as (1) each looped t-stem or d-stem. Evaluate as (2) each t-stem or d-stem where the downstroke retraces the upstroke. Evaluate as (3) each t-stem or d-stem where the downstroke forms a rigid inverted V with the upstroke. Sum the values, and find the average. (1'21″)

51. **T-Bar, Height on T-Stem**. Classify each t-bar as follows, and average the results: (59″)

(1) t-bar at or below level of adjacent middle-zone letters,
(2) t-bar at two-thirds of the height of t-stem, and above adjacent middle-zone letters,
(3) t-bar within the top one-third of t-stem, and above adjacent middle-zone letters, or
(4) t-bar higher than t-stem, not touching it.

52. **T-Bar, Weight (Pressure)**. For each t-bar, compare its weight (pressure) to the weight of its t-stem downstroke, and classify as follows, averaging the results: (1'12″)

(1) lighter than t-stem, either upstroke or downstroke,
(2) same as t-stem (assign doubtful cases here), or
(3) heavier than t-stem, either upstroke or downstroke.

53. **T-Bar, Length**. Evaluate each t-bar as follows, and average the results: (1'21″)

(0) t-bar covers no adjacent letter,
(1) t-bar covers part or all of one adjacent letter*, or
(2) t-bar covers part of all of two or more adjacent letters**.

*(In case of doubt, imagine lines parallel to t-stem and tangent to the ends of t-bar; this accounts for the effect of slant.)

**(In cases of initial and final letters, imagine the t-bar makes

one 360° revolution on its stem or vertical axis, like a helicopter rotor.)

54. **T-Bar, Cup-Shaped**. Count only curved t-bars that are higher at both ends than in the middle. Divide by the total number of t-bars.

##54 + 55 (1'10”)

55. **T-Bar, Cap-Shaped**. Count only curved t-bars that are lower at both ends than in the middle. Divide by the total number of t-bars.

56. **T-Bar, Tilted and Tapered**. Evaluate as +1 each t-bar whose right end is closer to the baseline and also fades and tapers to nothing at the right end. Evaluate as -1 each t-bar whose left end is closer to the baseline and also fades and tapers to nothing at the left end. Sum the values algebraically, and divide by the total number of t-bars. (49”)

57. **Precise Placement of i-Dot, j-Dot, t-Bar**. Count as (1) each t-bar center-balanced on the t-stem and each i-dot or j-dot which is over the stem. Count as (2) each “off-balance” t-bar which touches the t-stem, but extends to the left or right, and each i-dot or j-dot which is above an adjacent structure rather than its own stem. Count as (3) any uncrossed t-stem or undotted i-stem or j-stem. Average the results. (1'24”)

58. **T-Bar, Right of Stem**. Count each t-bar that is made to the right instead of crossing it. Divide by the total number of t-bars. (33”)

59. **T-Bar, i-Dot, j-Dot Left of Stem**. Evaluate as (2) each t-bar placed left of the t-stem. Evaluate as (1) each i-dot or j-dot placed left of the stem. Add these values and divide by twice the total number

of t-bars, i-dots, and j-dots. Report as percent. (1'7”)

60. **Circle-shaped i-Dots, j-Dots, Periods**. Count each i-dot, j-dot, or period made in the shape of a circle (or similar shape, as a heart) and divide by the total number of i-dots, j-dots, and periods. (23”)

61. **Round i-Dots, j-Dots, Periods**. Count the number of i-dots, j-dots, and periods which are truly round dots, not “jabbed” or distorted. Divide by the total number of dots and periods. ##61 + 62 (1'31”)

62. **“Jabbed” i-Dots, j-Dots, Periods**. Count the number of i-dots, j-dots, and periods which are neither round dots nor circles, but rather appear as short dashes or slashes. Divide by the total number of dots and periods.

63. **“Cactus-spine” Strokes**. Count each disconnected stroke which is tapered or needle-pointed, seen usually in t-bars, i-dots, j-dots, x-bars, and hyphens. Divide by the total number of disconnected stroke-formations. (1'19”)

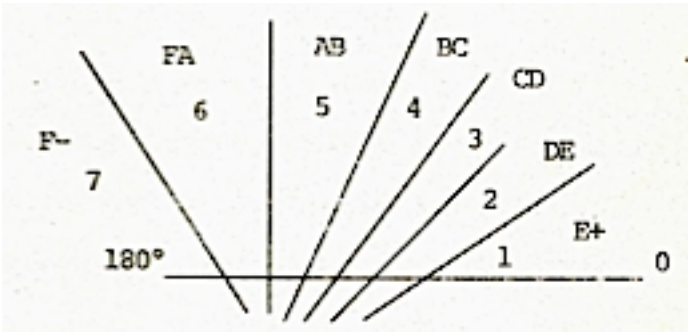
64. **Width of the Letters**. Measure the distance between the topmost points of each letter u and between the lowest points of the first “hump” of each letter m. Average the results. (2'17”)

65. **Slant of the Letters**. Construct baselines as necessary, and use a protractor (or Graphoanalysis slant gauge) to measure the angle between it and the slant line. The slant line may be drawn or imagined between the point where each upstroke leaves the baseline and the point where it stops going up. Measure a final stroke only when it is as high as the previous middle-zone formation.

Measuring Handwriting Variables

Graphoanalysts ordinarily measure 100 consecutive upstrokes (in this study, the **last** 100 will be used) and classify slant angles as follows (starting at the right end of the baseline, and proceeding counterclockwise to the left):

(1) E+ 0°- 33°
(2) DE 34°- 46°
(3) CD 47°- 54°
(4) BC 55°- 67°
(5) AB 68°- 90°
(6) FA 91°-124°
(7) F- 125°-180°



To expedite data processing, rate each upstroke from 1 to 7 (E+ =1) depending on which angle-interval it falls into. Report both the overall average, and the percent found in each slant interval. (13'4")

66. **Distance between Letters**. In a sample of N words, average the values obtained from every (N/10)th word.* Imagine two perpendiculars to the word's baseline which are tangent to the right and left extremities of the word, exclusive of disconnected strokes. Measure the shortest distance between these two perpendiculars. Sum the lengths of 10 words, and subtract the product of #64 (Width of the Letters) times the number of letters involved, giving each letter m or w double value. Divide by the number of spaces between letters. *(If the word selected is hyphenated or has less than four letters, use the preceding word of 4 letters or more. Resume counting from the (N/10)th word, however. (4'16")

67. **Height of the Middle Zone**. In a specimen of N words, average the values obtained from every (N/10)th word. Disregard 2- or 3-letter words. Measure the length of the slant line for each upstroke between the baseline and a parallel line through the topmost point of the upstroke. Disregard formations which look like capitals. Count only upstrokes from middle-zone letters, the last upstroke of the letters b, h, k, p, and the first upstroke of the letters d, g, j, q, y, and z. (8'2″)

68. **Height of the Capital Letters**. Through the highest point of each capital letter, place (or imagine) a short line which runs parallel to the baseline of the word as nearly as possible. Draw or imagine a perpendicular line between the baseline and the line at the top of the capital letter. Measure the distance between the two lines thus defined for each capital letter. Take their average. For capital M, measure each hump as a separate letter. (1'14″)

69. **Height of the Upper Zone Letters**. Trace a short line (or imagine it) through the highest point of each upper-zone letter, parallel to the baseline. Measure the length of the perpendicular line segment between these parallels, and average the results. Omit t's and d's which are rated separately in #70, below. Also, omit letters whose upstrokes begin above the baseline, as those following the letters o, b, w, v, and some s's. (5'6″)

70. **Height of T's and D's**. Relative to the value of height of the middle zone (#67), classify each t and d as follows, and average the results: (4'32″)

(1) less than twice as high as the middle zone,
(2) two to 2.5 times as high as the middle zone, or
(3) greater than 2.5 times as high as the middle zone.

71. **Height of the Lower Zone**. Measure the distance from the point where the baseline is crossed by the downstroke of each lower-zone letter to the point marking the stroke's farthest extremity. Average the results. (4'25")

72. **Intra-word Anomalies**. Disregarding initial letters, count each exaggerated letter k, r, or other letter appearing within a word in the form of a capital, printed or cursive, such that its middle-zone height is greater than the adjacent lower-case letters. Divide the sum of the total number of letters, less the number of words. (1'6")

73. **Length of Final Strokes**. For any final stroke that descends to the baseline and extends to the right in such a way as to be tangent to the baseline rather than intersect it when extended, measure the distance between its right extremity* and the point where the preceding upstroke crosses the baseline. Tally the **frequency** of finals that qualify, and retain for computing #73A, below. Average the quantitative values (lengths), and subtract the value for #64 (Width of the Letters). *(Right extremity is the endpoint of the stroke, unless the stroke curves left, when it is the point where a tangent is perpendicular to the baseline.) ##73 = 73A (5'43")

73A. **Frequency of Long Finals**. Divide the frequency count from #73 by the total number of finals (except disconnected strokes).

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74. **Sum of Upper Zone Height + Lower Zone Height**: (69 + 71)
75. **Ratio of Middle Zone Height to Upper Zone Height + Lower Zone Height**: (67 / 74)
76. **Ratio of Upper Zone Letter Height to Capital Letter Height**: (69 / 68)
77. **Width-to-Height Ratio for Middle Zone Letters**: (64 / 67)
78. **Width-to-Height Ratio for Upper Zone Letters**: (64 / 69)
79. **Width-to-Height Ratio for Lower Zone Letters**: (64)/(67 + 71)
80. **Width-to-Height Ratio for Capitals**: (64 / 68)

Measuring Handwriting Variables

Report Sheet for Handwriting Specimens

Variables

PER CENTS (44) **MEASURES (17)** **RATINGS (13)** **I.D._____**

PER CENTS (44)	MEASURES (17)	RATINGS (13)	
11.	1.	15.	
34.			No. of Letters =
12.	2.	37.	
35.			No. of Words =
13.	3.	45.	
36.			No. of Lines =
14.	4.	46.	
38.			U.Z. Letters =
16.	5.	49.	
39.			Descenders =
17.	6.	50.	
40.			Number of f's =
18.	7.	51.	
41.			Disconnected
19.	8.	52.	Strokes:
42.			
20.	9.+/-	53.	t-bars =
43.			
21.	10.	56.+/-	x-bars =
44.			
22.	64.	57.	hyphens =
47.			
23.	66.	65A	i-dots =
48.			
24.	67.	65B 1 =	j-dots =
54.			
25.	68.	2 =	No. of Initial or
55.			Final Strokes:
26.	69.	3 =	
58.			hyphens =
27.	71.	4 =	+
59.			“breaks” =
28.	73.	5 =	+
60.			No. of words =
29.	COMPOSITES (7)	6 =	
61.			
30.	74.	7 =	All finals,
62.			less i-dots
31.	75.	70.	and j-dots =
63.			
32.	76.	Report all percents with no decimals;	
72.			
33.	77.	report all measures to nearest tenth;	
73A.		(distance, to nearest 0.5 mm.)	
	78.	(angles, to nearest 0.5°)	
	79.	report all ratings to nearest tenth;	
	80.	report all composites by above rules.	

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