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THE DRAWING DICTATION TEST

THESIS

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By

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Approved by:



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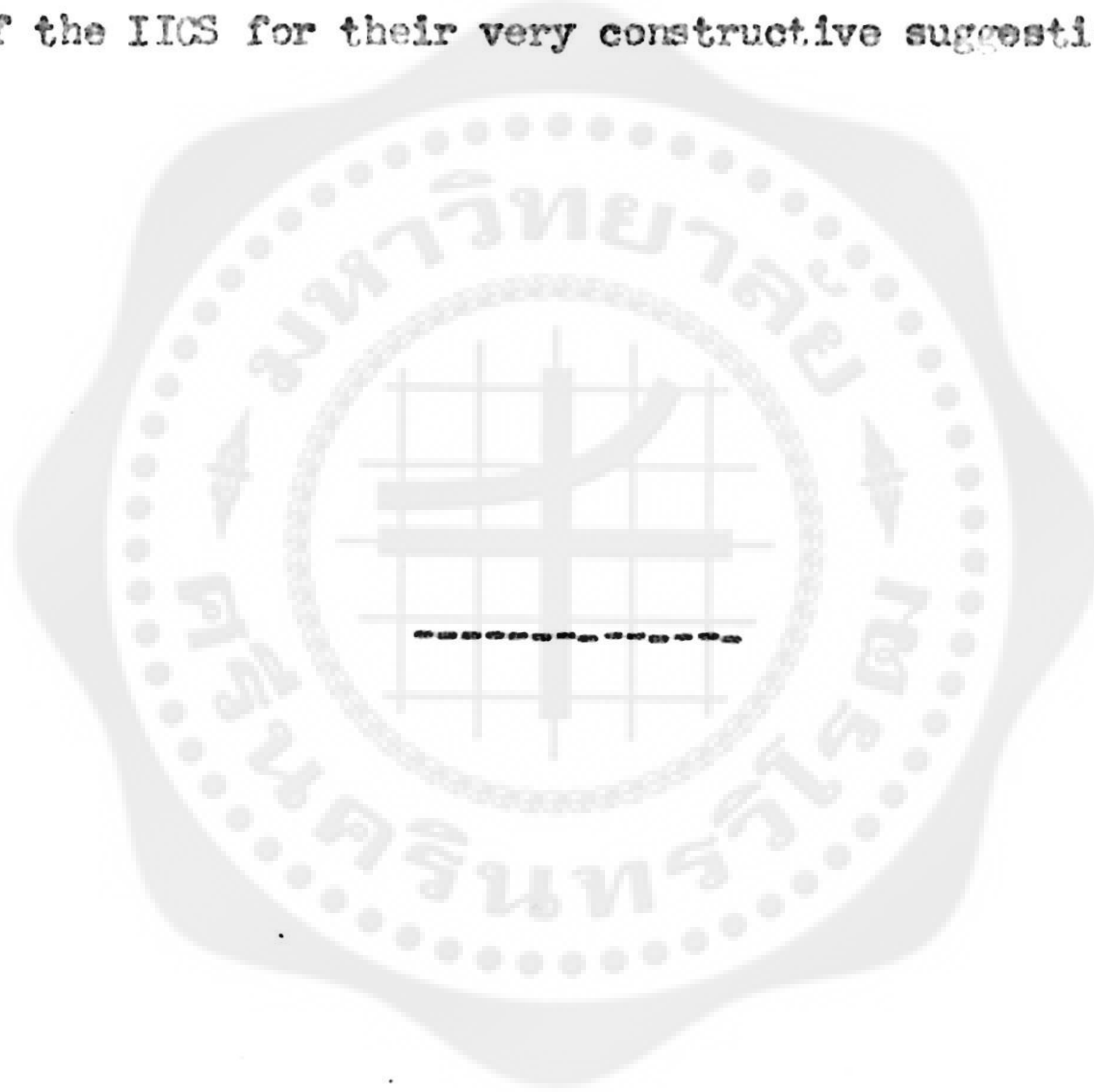


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INTRODUCTION

The research project of the IICS was planned with a view to collect comparable data about the personality development of children in different cultures. The main aim was to apply the results of the research for assistance in problems of education.¹ Educators will be more efficient in their work if they know much about the nature of their children. Personality development is multidimensional: it concerns with all behaviors of children, both overt and invert. So a certain number of tests and interviews were developed or selected to use for this investigation. They included all aspects, such as intellect, perception, drive, emotion, interest, value and sociability.

The drawing Dictation Test was one of the test to be used. It was a new test developed by Dr. Ernest E. Boesch, the Director of the IICS. What was required from the subjects was to draw, at any place and of any size, nine signs after dictation of the tester and to remake exactly the same by their memory on new sheets.

The spontaneous organization of the given signs by the children was determined by their originality, their power to perceive and imagine and their feeling of aesthetics. The memory sheet showed ability to retain and sometimes was used to ascertain whether the subject intended to arrange some signs into a pattern.

¹For details see Research Plan, presented by Dr. Ernest E. Boesch, Director of the IICS, 1956, pp: 1-14.

Most young children like drawing. Their first drawings are free expressions of their imagination and feeling.¹ Because of this fact the drawing of a problem child is sometimes used by the psychologist or the psychiatrist for diagnosing the cause of the child's defective behavior. Moreover, there are various stages of development in children's drawings.

A little girl of three years old, for example, may draw something which looks like a tadpole and tell her mother that she is drawing the picture of her father. Frequently, we do not know and do not understand what children have drawn unless they tell us what they are. By the time they grow older they are more conscious of the defects in their drawings. They have acquired the idea that drawing must represent reality and not merely express what they feel. They have learned that good drawing should have good form and good proportion to resemble real objects. If they fail to improve their abilities up to their satisfaction and if no one appreciates their drawings they will soon stop trying. Having the attitude that drawing is difficult, they will feel uneasy when they are asked to draw living things or any objects; simple geometrical forms, on the other hand, will not discourage them.

The Lowenfeld Mosaic Test (L.M.T.) also uses simple elements like these which are a lot of coloured pieces of square, half square, diamonds, equilateral triangles and scalenes. There is a close correspondence between the characteristics of the test designs and the patterns of behavior shown by the subjects in their daily lives.² The Drawing

¹ Ruth Strang, An Introduction to Child Study, (New York: The Macmillan Co., 1951), p. 332.

² Margaret Lowenfeld, The Lowenfeld Mosaic Test, (London: Newman Neame Limited, 1954), p. 25.

Dictation Test is simpler than the L.M.T. so it may show less aspects of personality of the subject but it can tell many things. Lowenfeld also used the L.M.T. for studying development in children. Some differences between the L.M.T. and the Drawing Dictation Test are as follows:

L.M.T.

Drawing Dictation

1. Subjects are told to use colour pieces to make nice things on the tray.

1. Subjects are not required to make any designs.

2. Subjects know what shapes and colours are available.

2. Subjects do not know what and how many signs will be dictated to them.

3. The pieces can be removed or rearranged until the subject is satisfied in unlimited time.

3. If there is an intention to change the place of any signs the old one must be crossed out.

Being pressed to draw quickly, subjects have little time to decide.

It was interesting to try out whether children could organize those signs which were dictated successively one after another into any structures. The development of creative imagination is more or less related to the mental development of the child.

Here the investigator decided to study steps of development in the retention of the given signs, the free arrangements of them and different uses of space by the children.

The data at hand were gathered from 4 primary schools in Bangkok by group testing.

The word "Pratom" or in abbreviation "P." is ^a Thai word for "elementary grade".

All tables inscribed here will be numbered after the page numbers to which they belong.



PART I

DESCRIPTION OF THE SAMPLE, MATERIALS
AND PROCEDURES OF THE TEST

CHAPTER I

THE SAMPLE, MATERIALS AND PROCEDURES
OF THE TESTI.1 THE SAMPLE

The criterion for selection of schools for the investigation of children in Bangkok was that those schools should more or less represent the socio-economic distribution of the Bangkok population. The test was given to nine groups of 313 primary grade children, 158 boys and 155 girls of four schools. Hereafter they shall be called School A, B, C and D respectively.

TABLE 5. - Number of Subjects in the Experimental Classes

School and Grade	Boys	Girls	Total	Mean Age
A1a	22	20	42	7/10
A1b	13	21	34	7/11
D1	18	12	30	6/18
Total	53	53	106	7/7
B2	35	0	35	8/0
C2	4	28	32	8/0
Total	39	28	67	8/0

TABLE 5. (Contd.) - Number of Subjects in the Experimental Classes

School and Grade	Boys	Girls	Total	Mean Age
B3	32	0	32	8/5
C3	0	41	41	8/11
Total	32	41	73	8/8
A4	18	26	44	11/11
D4	16	7	23	9/7
Total	34	33	67	11/1

TABLE 6. - Classification of Subjects into 6 Age Groups

Grade \ Age Group	I	II	III	IV	Total
4/9 - 6/8	27				27
6/9 - 7/8	34	26	1		61
7/9 - 8/8	33	29	40		102
8/9 - 9/8	10	10	26	17	63
9/9 - 11/8	2	2	5	26	35
11/9 - 14/8			1	24	25

The first age group composed of 23 children of ages between 5 years 9 months to 6 years 8 months and 4 children of 4/9 to 5/8. They were put together because when the data were analysed the small number would make the norm of the group very unreliable. Similarly the fifth group composed of 21 children of 9/9 - 10/8 and 14 children of 10/9 - 11/8; the sixth group composed of 15 children of 11/9 - 12/8, 7 children of 12/9 - 13/8 and 3 children of 13/9 - 14/8. The number of children in each class which belonged to various age groups are shown in Appendix II.

Occupation of Parents of the Pupils in the Experimental Classes.

Since only the kinds of occupation and not the levels of occupation were known from the school record; so the incomes of the parents were also unknown. The occupation of parents could be roughly divided into two groups according to their income.

(i) The higher income group composed of:- Professional workers officials, teachers and clerical workers.

(ii) The lower income group composed of transport-workers, manual workers, salesmen, laborers, service-workers and farmers.

In school A as indicated by Table 8, most of the parents were poor. The experimenters who had observed and had close contact with the subjects admitted that nearly all the pupils in School A came from very poor families. Their clothes were not clean and some had no shoes and had insufficient school appliances. While in School D most of the pupils came from high class families. The parents of the pupils in School B and C also had moderate and high income in majority.

TABLE 8. - The Approximate Percentages of the Two Main Income Groups of Parents.

Income Group	School									
	Ala	Alb	A ₄	B ₂	B ₃	C ₂	C ₃	D ₁	D ₄	
1. The higher income group	26	31	28	74	82	87	70	90	91	
2. The lower income group	74	69	72	26	18	13	30	10	9	

1.2 MATERIALS USED

- (i) Empty sheets of fool's cap size
- (ii) Black pencil (Lyra No. 2) without eraser
- (iii) Light cardboards as pads.

1.3 PROCEDURES OF THE TEST

The test consisted of 2 sessions:

- (i) drawing on dictation,
- (ii) drawing on memory.

During the first session the children were dictated to draw successively: a line, another line, a circle, a triangle, seven spots, a cross, five lines, a quadrilateral and the subject's own name. The size and where they were actually put were left entirely to the decision of the subject.

When the sheets were collected new blank sheets were distributed. Then the children were asked to reproduce exactly the same drawing in the same arrangement, by memory. For the actual wording of the instructions and the time allowed, see Appendix I.

PART 2

ANALYSIS OF DATA AND INTERPRETATION IN TERMS OF FINDINGS

CHAPTER 2





CHECKING ALL SIGNS


The first step to be taken was to count how many signs were right, how many signs were wrong or incomplete or missed and how many units of excess signs appeared on the drawing sheets of the subjects.

Children might not know the definitions of these geometrical forms because there is no geometry course in elementary school in Thailand. But they should know them from drawing hours and from incidental experiences in their daily life. In drawing, one must control one's eye-hand co-ordination. Even adults cannot draw these forms with free hand as well as when draw with ruler and compasses. Young children, especially in Pratom I are not ready to use their small muscles of eyes and hands. In counting the right signs in children's drawing the neatness was not considered. The procedure did not allow them to use eraser so that it will be possible to study the drawing process whenever it is needed. They were told to cross out what they wanted to rub off. Instead of bad execution, if the characteristics of the signs still could be recognized to be that of the dictated signs, all of them were assumed to be all right.

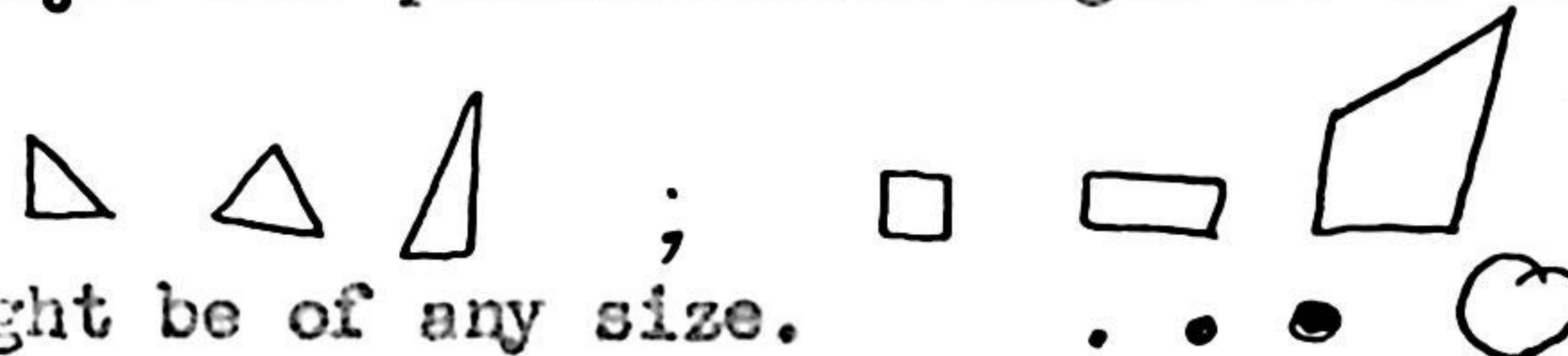
Criteria for Determination of the Right Signs, Wrong Signs, Incomplete Signs and Missing Signs.


2.1 The Right Signs. They were all right whether:

- (i) any lines or the perimeter of those forms might be curved ,
- or zigzag , or repeated  or hairy 

(ii) the circle might be an oval or distorted to some extent but still recognizable as a ring and not a polygon. 

(iii) the triangle and quadrilateral might be of any kind.



(iv) spots might be of any size. 

(v) the cross might be $+$ \times \dagger \oplus \otimes

(vi) the name might be written with the title "boy (ອ.ຮ. or ເດັກຊາຍ)" or "girl (ອ.ນຸ. or ເດັກນຸ່ງ)" or the word "name".

2.2 The Wrong Signs

In a defective right sign the subject knew the real form corresponding to its name but the ability of free hand drawing did not allow him or her to draw it exactly. But in wrong signs the subjects did not know how to draw them or they could not recall the right forms, as in the case of many children in Pratom I, ^{who} wrote their names wrongly. The following are examples of wrong signs.

Dictated Sign

Wrong Signs

circle



triangle



quadrilateral



cross



The most common errors are the triangle, the quadrilateral and the name of young children.

2.3 The Incomplete Signs

Some subjects draw spots and lines in a smaller number than what they were told by the tester. So it was incomplete in number. Sometimes the form of a sign was not completed. A sign was considered to be incomplete when it was left unfinished, for example:-

A triangle had only 2 sides \wedge , a circle was left open C at one edge of the paper, or names were written incompletely.

If a sign was attached to the other sign such as \sphericalangle \square it was not assumed to be incomplete.

The result of the checking of all signs will be presented in the following. For abbreviation, hereafter, R, W, I, M will be used to stand for "right signs", "wrong signs", "incomplete signs" and "missing signs" respectively.

TABLE 11. - Percentages of R, W, I and M in the First Sheets of the Nine Classes.

School and Grade	R	W	I	M
A ₁ .a	89.43	6.50	1.63	2.44
A ₁ .b	95.42	1.31	1.63	1.63
D ₁	97.41	1.48	0.74	0.37
B ₂	96.51	3.49	0.00	0.00
C ₂	98.26	1.39	0.35	0.00
B ₃	97.57	2.43	0.00	0.00
C ₃	96.48	1.90	0.54	1.08
A ₄	98.23	1.77	0.00	0.00
D ₄	100.00	0.00	0.00	0.00

D₄ did the best and all signs were complete. A_{1a} did the most W, I and M. Instead of these defects, the percentage of R in A_{1a} is still very high (89.43%). This indicates that the nine signs being used are not too difficult for children in elementary grades.

For the whole range of each grade Table 12A shows that the percentages of R tend to increase with grade while that of W, I and M tend to decrease. It is noted that children in D₁ performed as well as children in Pratom II.

TABLE 12 A. - Percentages of R, W, I and M in the First sheets of the Four Grades.

Grade	R	W	I	M
I	93.65	3.39	1.38	1.58
II	97.35	2.49	0.17	0.00
III	96.96	2.13	0.30	0.61
IV	98.84	1.16	0.00	0.00

Checking all reproduced signs in memory sheets yields result as shown in Table 12 B.

TABLE 12 B. - Percentages of R, W, I and M in the Memory Sheets of the Nine Classes.

School and Grade	R	W	I	M
A _{1a}	79.10	3.70	2.12	15.08
A _{1b}	78.10	0.98	2.29	18.63
D ₁	83.70	0.74	1.11	14.44
B ₂	84.72	1.73	0.69	12.85
C ₂	82.64	1.74	1.04	14.58
B ₃	87.50	1.74	0.35	10.42
C ₃	87.53	0.27	1.36	10.84
A ₄	97.47	0.51	0.25	1.77
D ₄	94.20	0.00	0.97	4.83

Nearly in every class the percentage of W decreases slightly while that of I increases slightly but that of M is very much higher than in sheet I. Children seemed to drop W in sheet II and made more incomplete signs, especially number of lines and spots were less than the correct number. Many children, as found quite a lot in Pratom I but less and less in the higher grades, forgot the last item or their names which was the only sign different from the eight former signs in its nature and because they had written their names once already on the top of their papers.

The average of the whole range of each grade shows clearly that the capacity to reproduce all signs increases with higher grades. (See Table 13)

TABLE 13. - Percentages of R, W, I and M in the Memory Sheets of the Four Grades.

Grade	R	W	I	M
I	30.08	1.99	1.89	16.04
II	83.68	1.74	0.87	13.72
III	87.52	0.91	0.91	10.65
IV	96.35	0.33	0.50	2.82

2.4 The Missing Signs.

In the first sheets there were only few M. Their existence were probably due to 3 factors.

(i) Distraction by subject's own preoccupation or by talking, playing with friends.

(ii) Hearing was disturbed by the friends near by making noises.

(iii) The subjects could not draw some signs because they did not know how to draw them.

Only 13 subjects out of 312 who missed 1 sign and only 3 who missed 2 signs.

Note. The total becomes 312 because one girl of Ala did not draw but wrote the dictated words in every item. But in the memory sheet she drew the signs as was dictated. Only the item of 7 spots is incomplete, having only 5 spots. So her first sheet is excluded from the tables because she did not understand the instructions.

More details of M in the memory sheets will be examined in the followings.

TABLE 14. - Percentages of Subjects Corresponding With Number of M in the Memory Sheets of the Nine Classes.

School and Grade	No. of M					
	0	1	2	3	4	5
Ala	23.81	49.48	21.43	7.14	4.76	2.38
Alb	11.76	32.35	35.30	17.65	2.94	
D1	20.00	40.00	30.00	10.00		
B ₂	21.88	46.88	25.00	6.25		
C ₂	21.88	43.75	18.75	12.50	3.13	
B ₃	43.75	28.13	18.75	9.38		
C ₃	29.27	56.10	7.32	4.88		2.44
A ₄	88.64	6.82	4.55			
D ₄	65.22	26.09	8.70			

Most subjects forgot only 1 sign.

Very few subjects who forgot up to 4 or 5 signs.

See table 15 B. it is clear that 50 % of all classes except Alb missed not more than 1 sign, and 80 % of them except Alb missed not more than 2 signs.

TABLE 15 A. - Cumulative Percentage of M in the Memory Sheets of the
Nine Classes.

Missing Signs	Ala	Alb	D1	B2	C2	B3	C3	A4	D4
5	100.00	100.00					100.00		
4	97.62	100.00			100.00		97.56		
3	92.86	97.06	100.00	100.00	96.88	100.00	97.56		
2	85.72	79.41	90.00	93.75	84.38	90.63	92.68	100.00	100.00
1	64.29	44.12	60.00	68.75	65.63	71.88	85.37	95.45	91.30
0	23.81	11.76	20.00	21.88	21.88	43.75	29.27	88.64	65.22

TABLE 15 B. - Percentiles of Number of M in the Memory Sheets of the Nine
Classes.

School and Grade Percentile	Ala	Alb	D1	B2	C2	B3	C3	A4	D4
100th	5	5	3	3	4	3	5	2	2
90th	3	3	2	2	3	2	2	1	1
80th	2	3	2	2	2	2	1	0	1
70th	2	2	2	2	2	1	1	0	1
60th	1	2	1	1	1	1	1	0	0

TABLE 15 B. - (Contd.) - Percentiles of Number of M in the Memory Sheets
of the Nine Classes.

School and Grade Percentile	A1a	A1b	D1	B2	C2	B3	C3	A4	D4
50th	1	2	1	1	1	1	1	0	0
40th	1	1	1	1	1	0	1	0	0
30th	1	1	1	1	1	0	1	0	0
20th	0	1	0	0	0	0	0	0	0
10th	0	0	0	0	0	0	0	0	0

(Calculation is shown in Appendix V.1)

Retention of 2 signs increases with grade as shown in Table 16.

TABLE 16. - Percentages of Subjects Corresponding with Number of M in
the Memory Sheets of the Four Grades.

Grade	No. of M					
	0	1	2	3	4	5
I	18.87	37.74	28.30	11.32	2.83	0.94
II	21.88	45.31	21.88	9.38	1.56	
III	35.62	43.84	12.33	6.85		1.37
IV	80.60	17.43	5.97			

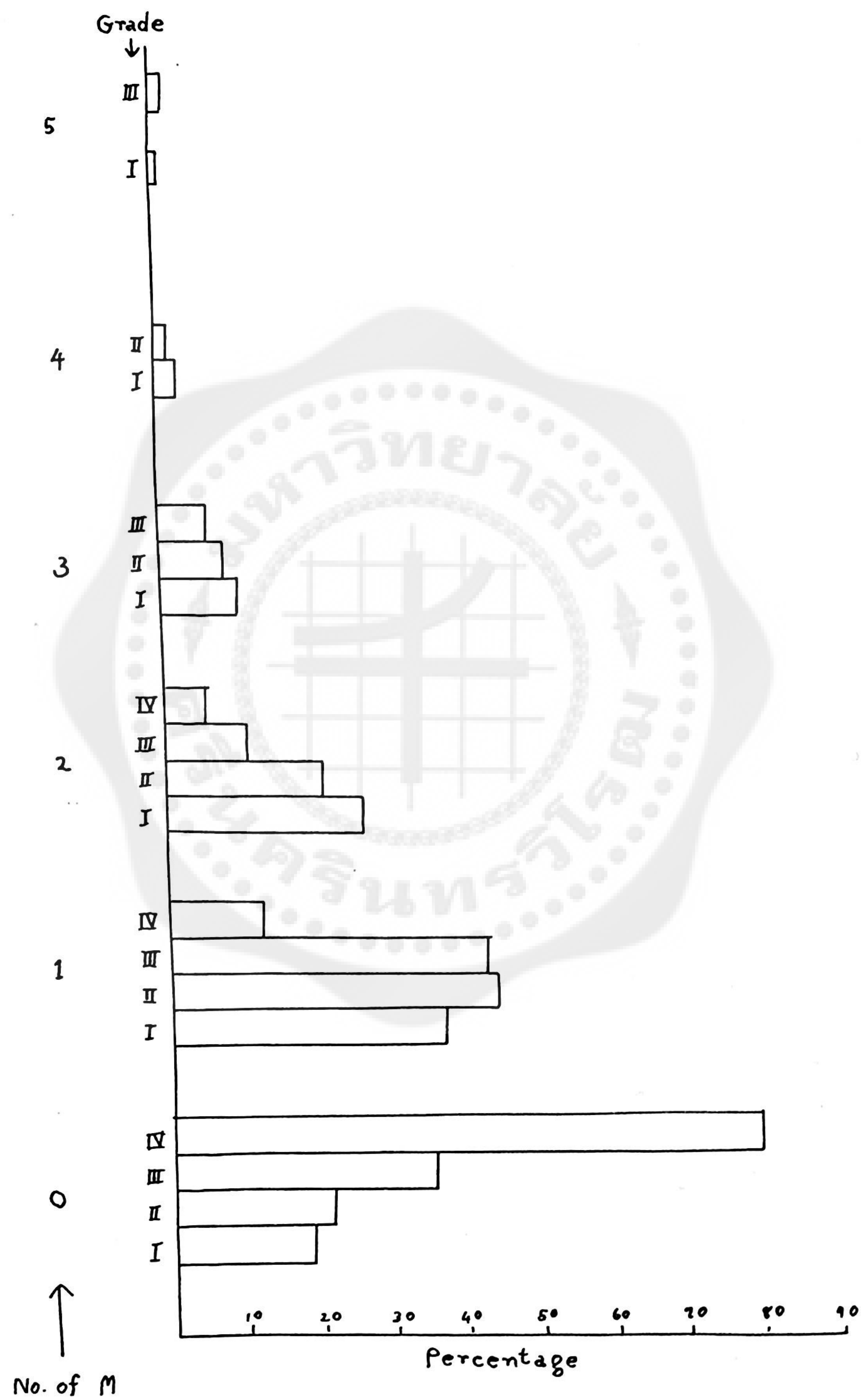


FIGURE 17./ Percentage Dis'ribution of Missing Signs in the Memory Sheets of the Four Grades.

(From Data of Table 16)

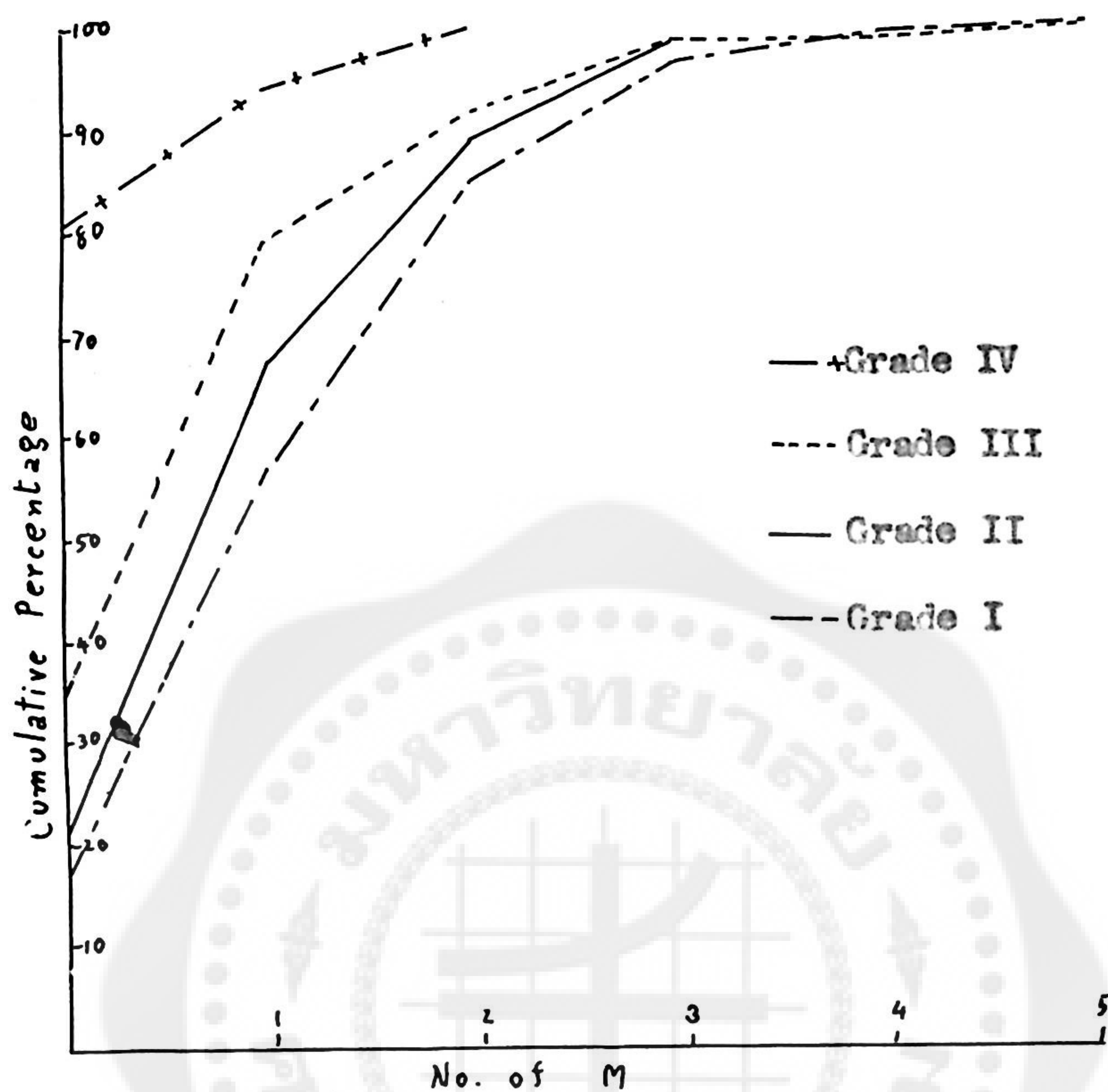


FIGURE 18.- Cumulative Percentage Curves of Number of Missing Signs in the Memory Sheets of the Four Grades.
(From Data of Table 16)

Figure 18 shows that ^{the} power to recall of children in P. IV exceeds that of children in P. III highly. Only some children in P. IV forgot 1 or 2 signs, while the majority 80.6% could retain all the nine. Their mean age was 11 years 1 month. It suggests that it may be easy for secondary grade children to remember all 9 signs.

TABLE 19 A. - Cumulative Percentage of M in the Memory Sheets of the Four Grades.

M	Grade I	Grade II	Grade III	Grade IV
5	100.00		100.00	
4	99.06	100.00	98.63	
3	96.23	98.44	98.63	
2	84.91	89.06	91.78	100.00
1	56.61	67.19	79.45	94.03
0	18.87	21.88	35.62	80.60

Table 19 B. shows that 50 % of all classes missed not more than 1 sign and 80 % of them forgot not more than 2 signs.

TABLE 19 B. - Percentiles of Number of M in Memory Sheets of the Four Grades.

Percentile Grade	Percentile									
	10th	20th	30th	40th	50th	60th	70th	80th	90th	100th
I	0	1	1	1	1	2	2	2	3	5
II	0	0	1	1	1	1	2	2	3	4
III	0	0	0	1	1	1	1	2	2	5
IV	0	0	0	0	0	0	0	0	1	2

(This is shown in Appendix V.2)

Working in terms of their ages also shows that ^{the} capacity to retain dictated signs increases with age.

TABLE 20 A. - Percentages of Subjects in Various Age Groups Corresponding with Number of M in Their Memory Sheets

Age	No. of M					
	0	1	2	3	4	5
4/9 - 6/8	18.52	37.04	29.63	11.11		3.70
6/9 - 7/8	20.69	34.48	29.31	12.07	3.45	
7/9 - 8/8	26.47	39.22	20.59	10.78	1.96	0.98
8/9 - 9/8	39.68	47.62	9.52	3.17		
9/9 - 11/8	65.71	28.57	5.71			
11/9 - 14/8	88.00	12.00				

TABLE 20 B. - Cumulative Percentage of M in the Memory Sheets of the Six Age Groups.

M	4/9 - 6/8	6/9 - 7/8	7/9 - 8/8	8/9 - 9/8	9/9 - 11/8	11/9 - 14/8
5	100.00	100.00	100.00			
4	96.30	100.00	99.02			
3	96.30	96.55	97.06	100.00		
2	85.19	84.48	86.28	96.83	100.00	100.00
1	55.56	55.17	65.69	87.30	94.29	88.00
0	18.52	20.69	26.47	39.68	65.71	88.00

Table 21 shows that 50% of all age groups forgot not more than 1 sign, 80% of them forgot not more than 2 signs and 90% missed not more than 3 signs.

TABLE 21. - Percentile of Number of M in Memory Sheets of the Six Age Groups.

Age Group Percentile	4/9 - 6/8	6/9 - 7/8	7/9 - 8/8	8/9 - 9/8	9/9 - 11/8	11/9 - 14/8
100 th	5	5	5	3	2	2
90 th	3	3	3	2	1	1
80 th	2	2	2	1	1	0
70 th	2	2	2	1	1	0
60 th	2	2	1	1	0	0
50 th	1	1	1	1	0	0
40 th	1	1	1	1	0	0
30 th	1	1	1	0	0	0
20 th	1	0	0	0	0	0
10 th	0	0	0	0	0	0

(Continued on page 22, in Appendix V.)

2.5 The Excess Signs (E)

Excess signs were counted in unit. That is a unit of E may consist of more than one ^{line} or spot. They may be differentiated into 6 types.

1. They may be traces of pencil strokes, produced by chance, or the subjects intended to draw but they have no meaning for the investigator to understand, e.g. . η . η

2. They may be traces of changing the mind to draw at new places. These should be crossed out but the subjects did not do so. Some subjects attempted to rub them off by finger or with saliva. These may be incomplete or complete signs as well.

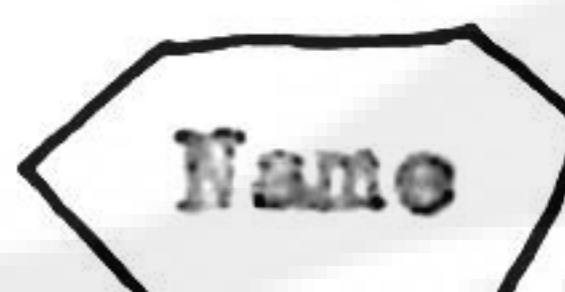
3. Number of lines or spots in excess.

4. Some E are used to decorate other signs into realistic structure like a snake, a house, a road, (see Appendix V, figure VIII B.1 and VIII B.2) or such insignificant signs as:

Name



Name



o




Some are used as frame or part of frame bordering other signs.

5. Some are realistic structures e.g. house, tree, person. These happened after the former test of House-Tree-Person which probably impressed the child to draw it again. But this is very rare.

6. Other rare excess signs such as three out of 313 subjects drew circles with centres. The centre is an excess sign.

Table 23 will show how often the excess signs occurred in each class. Table 23 shows that $A_1.a$ made the most excess signs (23.31%) by 63.41 % of the subjects. The other classes drew few E. D_4 did the best in cleanliness and had the least E (0.48% which corresponds to 1 excess sign, that very sign is a spot more than 7 spots).

TABLE 23.- Frequency and Percentages of Subjects Who Made E and of E in
the First Sheets of the Nine Classes.

School and Grade	Total Subjects	No. of S Who Made E	% of S Who Made E	Total Dictated Signs	No. of E	% of E
Ala	41	26	63.41	369	86	23.31
Alb	34	10	29.41	306	16	5.23
D1	30	10	33.33	270	16	5.92
B ₂	35	5	14.29	315	10	3.17
C ₂	32	10	31.25	288	12	4.17
B ₃	32	2	6.25	288	2	0.69
C ₃	41	6	14.63	369	7	1.90
A ₄	44	5	11.36	396	13	3.28
D ₄	23	1	4.35	207	1	0.48

(S means "subjects")

TABLE 24.- Frequency and Percentages of Subjects Who Made E and of E
in the First Sheets of the Four Grades

Grade	Total S	No. of S Who Made E	% of S Who Made E	Total Dictated Signs	No. of E	% of E
I	105	46	43.81	945	118	12.49
II	67	15	22.39	603	22	3.65
III	73	8	10.96	657	9	1.37
IV	67	6	8.96	603	14	2.32

The number of E tends to decrease with higher grade. The percentage of subjects who made E becomes smaller with grade, and the same tendency is shown when working in terms of age. Probably the older children are more careful in their performances and conform more to the order. Table 24 shows that the per cent of children who made E in Pratom II is about one half of that of P. I and this appears again between P. III and P. II.

For memory sheets see Table 25 A.

The trend also resembles that of sheet I but the percentages are a little lower. Children in D₁ made less E than A_{1b}, A_{1a}: and in B₂, B₃ less than in C₂, C₃: and in D₄ less than in A₄.

TABLE 25 A. - Frequency and Percentages of Subjects Who Made E and of E
in the Memory Sheets of the Nine Classes

School and Grade	Total S	No. of S Who Made E	% of S Who Made E	Total Dictated Signs	No. of E	% of E
A1a	42	21	50.00	378	42	11.11
A1b	34	9	26.47	306	12	3.92
D1	30	5	16.67	270	11	4.07
B2	32	4	12.50	288	6	2.08
C2	32	12	37.50	288	19	6.60
B3	32	1	3.13	288	1	0.35
C3	41	7	17.07	369	8	2.17
A4	44	4	9.09	396	4	1.01
D4	23	1	4.35	207	1	0.48

TABLE 25 B. - Frequency and Percentage of S Who Made E and of E in the
Memory Sheets of the Four Grades.

Grade	Total S	No. of S Who Made E	% of S Who Made E	Total Dictated Signs	No. of E	% of E
I	106	35	33.02	954	65	6.81
II	64	16	25.00	576	25	4.34
III	73	8	10.96	657	9	1.37
IV	67	5	7.46	603	5	0.83

It is obvious that, in the higher grade less excess signs are founded. Percentage of E and S who made F in P. I are lesser than that of Sheet I. While in P. II, III and IV they are nearly constant.



CHAPTER 3

CLASSIFICATION OF GROUPING SIGNS

In attempting to present the classification of grouping signs, certain factors about instructions have to be considered. As has been mentioned, the wording of the instructions does not ask the subject to organize the signs together, so it was found that the vast majority of the subjects used the complete freedom offered by placing all signs separately from each other. Nevertheless, a definite relationship can be detected among some signs. The subjects also did not know in advance how many signs of what forms were available. Study of the data so far obtained reveals that the well organized structure in which many signs were needed to form an integrated structure are very rare. Moreover, the signs were told only one at a time, so in organization the subject must imagine step by step, while perceiving the old signs which had been drawn, where it was suitable for the new sign to be placed. The subjects were pressed to draw quickly, so they had little time to change their mind or to make decision. In such a situation, the resolution of the subjects would be influenced by the following:

(i) Feeling of aesthetics.

This means an attempt to draw the dictated signs in good forms, keep cleanliness, and cover the space properly,. But using of space includes other feelings as well. Some children drew all the signs in small sizes and placed them at one edge or a corner regardless of the size of the whole paper. It may be due to a feeling of insecurity or an intention

to keep space in expecting a lot of signs to be dictated.

(ii) Power to integrate new sign with former signs. This includes origi-
native thought, intellect, imagination and taste of the subject. It is
assumed that in different types of grouping, the more signs involved
require the more spontaneous initiative thought.

If there are more than one group in a sheet, only the biggest which
composes the ^{greatest} number of signs will be considered for classification.

Definition of the Terms Used.

1. Symmetrical pattern

This implies bilateral symmetry in the arrangement of the signs.
It can be divided into two similar parts by a plane passing through
the centre.

2. Realistic Pattern

It includes the arrangement that represent an object.

3. Asymmetrical pattern

In this type the subject puts many signs in a group. They show
feeling of companionship but they are not representing any objects.

It is more essential to think of the intention of the subject who
drew them than adhere to the definition given in the categories of class-
ification. Because those children were not allowed to use eraser and
they were free hand drawings.

Categories for Classification of Types of Grouping

(Examples of all types are in Appendix V).

- I. Grouping of 8 - 9 signs.
 - A. Symmetrical pattern
 - B. Realistic pattern
 - C. Asymmetrical pattern.

- II. Grouping of 5 - 7 signs.
 - A. Symmetrical pattern
 - B. Realistic pattern
 - C. Asymmetrical pattern.

- III. Grouping of 3 - 4 signs.
 - A. Symmetrical pattern
 - B. Realistic pattern
 - C. Asymmetrical pattern

- IV. Using lines as frame or borders of the other signs.
 - A. Bordering 2 adjacent sides
 - B. Dividing the paper into 2 equal parts
 - C. More than one sign being placed in a row between two lines
 - D. Bordering 3 sides or 4 sides.

- V. Grouping of 2 signs
 - A. Inclusion of subject's name in other sign
 - B. Combination of 2 signs in an original way
 - C. The first 2 lines meeting each other somewhere
 - D. The first 2 lines in adjacent having the same trend.

- VI. Arrangement of all signs in order of dictation
- A. Strictly to the order
 - B. With up to 2 exceptions.
- VII. Random order, (some signs may overlap the neighbouring signs by chance).
- VIII. Using excess signs
- A. To form symmetrical pattern
 - B. To form realistic pattern
 - C. To form asymmetrical pattern
 - D. As frame or part of frame.

The frequency and percentage distributions of these types in the first sheets per class, per grade and age are shown in Appendix VI. The frequencies of type I and II are few and the nature of type V and that of type III C are alike. It seems to be more appropriate if the categories for classification of types of grouping signs is rearranged as follows.

- (a) Realistic grouping of 5 - 9 signs (Old categories I B + II B)
- (b) Realistic grouping of 3 - 4 signs (III B)
- (c) Symmetrical grouping of 5 - 9 signs (I A + II A)
- (d) Symmetrical grouping of 3 - 4 signs (III A)
- (e) Asymmetrical grouping of 5 - 9 signs (I C + II C)
- (f) Asymmetrical grouping of 2 - 4 signs (III C + V)
- (g) Using lines as frame (IV)
- (h) Order of dictation (VI)

(i) Random order (VII)

(j) Helped by excess signs (VIII)

3.1 CLASSIFICATION OF GROUPING SIGNS IN THE FIRST SHEETS

TABLE 31. - Percentages of Different Types of Grouping Sign in the First Sheets of the Nine Classes.

School and Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 signs	3-4 signs	5-9 signs	3-4 signs	5-9 signs	2-4 signs				
Ala					9.76		34.14	21.95	24.39	9.76
Alb			2.94		2.94	17.65		70.59	2.94	2.94
D1			10.00		3.33	26.67	26.67	13.33	13.33	6.67
B ₂					2.86	40.00	31.43	17.14	8.57	
C ₂			3.13		3.13	31.25	9.38	31.25	18.75	3.13
B ₃				6.25	3.13	28.13	15.63	21.88	18.75	6.25
C ₃			2.44	9.76	4.88	17.07	14.63	46.34	2.44	2.44
A ₄	2.27	2.27	2.27	11.36	4.55	31.82	13.64	27.27	2.27	2.27
D ₄				4.35	26.09	17.39	8.70	30.43	13.04	

TABLE 32. - Percentages of Different Types of Grouping Signs in the First Sheets of the Four Grades.

Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
I				3.81	1.90	17.14	20.95	35.24	14.29	6.67
II				1.49	2.99	35.82	20.90	23.88	13.43	1.49
III			1.37	8.22	4.11	21.92	15.07	35.62	9.59	4.11
IV	1.49	1.49	1.49	8.96	11.94	26.87	11.94	28.36	5.97	1.49

Table 32 shows that the percentages of realistic, symmetrical and asymmetrical patterns increase with grade. But in P. II there are fewer symmetrical patterns of 3 - 4 signs (1.49 %) than it should be and there is a relatively high per cent of asymmetrical patterns of 2 - 4 signs (35.82 %).

The realistic patterns are very rare. It is very difficult for children to draw realistic patterns with those signs. It needs much creative ability, even in adult, together with spontaneous initiative thought. Moreover, as it was group testing, it is impossible to know certainly if some more subjects intended to represent an object or not. For examples, see Appendix V, in which figure IIc.5 tends to be a symbol of a house; and figure IV A. 3 the five lines attached to a vertical line looks like a flag.

Some patterns of IC, IIc partly show idea of symmetry. For examples,

look at the combination of the first 2 lines, the circle and the triangle of figures I C.3, I C.4 and IIC.3: It may be due to the inefficiency of children to adjust later signs to former signs or to the inconsistency of their aims in organization.

Some subjects placed signs with an idea of symmetry but the forms of the two corresponding signs are not the same. For examples, look at figure II C.1 and II C.4.

Asymmetrical patterns are more abundant than realistic and symmetrical patterns because they can be easily drawn by grouping some signs together in an abstract own way. Most of the children in P.II arranged 2-4 signs of this type.

The percentages of framing patterns decrease with grade. But in a higher grade the intention of the subject can be seen clearer. For example, see figure IV D.1, which belonged to subject No. 6 School Ala, and compare it with figure IV D.4, which belonged to subject No. 35 School A 4. Most children in P. I, III and IV arranged signs in this manner.

Most of the children in A₁.b arranged all signs in order of dictation (70.59%) and also did C₃ (46.34%). The general trend of these categories tends to increase with age or grade, showing more conformity to order by the older children. Note the percentages of these categories in a lower class and compare them with those of a high class of the same school in Table 31.

The category of random order is found less and less in the higher grades, showing the development of integrative, and creative thought in children.

Only few subjects intentionally use E (excess sign) in grouping signs together, See Appendix V under category VIII of the classifi-

ation. This also appears more frequently in Pratom I than in the higher classes.

Working with age groups also reveals the same trend as with grades.

See Table 34.

TABLE 34. - Percentages of Different Types of Grouping Signs in the First Sheets of the Six Age Groups

Age	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
4/9 - 6/8				7.41		18.52	29.63	25.93	11.11	7.41
6/9 - 7/8				3.33	5.00	31.67	18.33	28.33	8.33	5.00
7/9 - 8/8				2.94	0.98	23.53	15.69	38.24	14.71	3.92
8/9 - 9/8		1.59	1.59	7.94	11.11	15.87	15.87	28.57	14.29	3.17
9/9 - 11/8	2.86			8.57	8.57	31.43	14.29	28.57	5.71	
11/9 - 14/8			4.00	8.00	4.00	28.00	20.00	28.00	4.00	4.00

The developmental trend is not obvious because, firstly, the number of subjects in the first group and the last two groups are small; secondly, the number of subjects in each group varies greatly from one another, thus affecting the calculation of percentages; and thirdly, the older children in different classes were not the brighter, some being repeaters and some retarded children.

These factors also has effect in the later classification of seven spots, five lines and using of space.

From the developmental point of view, good patterns are those which appear more frequently in a higher grade than in a low grade. So to arrange the categories from the best to the worst, it is decided to calculate the difference between the accomplishment of children in Pratom I with that of P. IV. For each category of Table 32, the percentages of P. I and P. IV are divided by the sum of percentages of the four grades of that category and then the difference of the two results is computed. The final results are arranged in order of their quantity and this determines the adjustment of all categories from the best to the worst. The category in which excess signs play a role is neglected in the calculation because the instructions do not allow to the use of other signs besides those given by the dictation. Grouping signs with the help of excess signs of any type is assumed to be the worst type of grouping.

The series of those categories are as follows.

<u>Rank</u>		<u>Types</u>
1	Realistic grouping of 5 - 9 signs	(I B + II B)
2	Realistic grouping of 3 - 4 signs	(III B)
3	Symmetrical grouping of 5 - 9 signs	(I A + II A)
4	Asymmetrical grouping of 5 - 9 signs	(I C + II C)
5	Symmetrical grouping of 3 - 4 signs	(III A)
6	Asymmetrical grouping of 2 - 4 signs	(III C + V)
7	Order of dictation	(VI)
8	Framing with lines	(IV)
9	Random order	(VII)
10	Helped by excess signs	(VIII)

TABLE 36 A. - Cumulative Percentages of Types of Grouping Signs in the
First Sheets of the Nine Classes

Category Rank	Ala	Alb	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
1								100.00	
2								97.73	
3							100.00	95.45	
4		100.00	100.00	100.00	100.00	100.00	97.56	93.18	100.00
5		97.06	96.67	97.14	96.88	96.88	92.68	88.63	73.91
6	100.00	94.12	86.67	97.14	93.75	90.63	82.92	77.27	69.56
7	90.24	76.47	60.00	57.14	62.50	62.50	65.85	45.45	52.17
8	68.29	5.88	46.67	40.00	31.25	40.63	19.51	18.18	21.74
9	34.15	5.88	20.00	8.57	21.88	25.00	4.88	4.55	13.04
10	9.76	2.94	6.67	0.00	3.13	6.25	2.44	2.27	0.00

TABLE 36 B. - Percentiles of the Ten Categories of Grouping Signs in the
First Sheets of the Nine Classes.

Percentile	Ala	Alb	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
100 th	6	4	4	4	4	4	3	1	4
95th	6	5	5	6	5	5	4	3	4
90th	7	6	5	6	6	6	5	4	4
80th	7	6	6	6	6	6	6	5	4
70th	7	7	6	6	6	6	6	6	5
50th	8	7	7	7	7	7	7	6	7
40th	8	7	8	8	7	8	7	7	7
30th	9	7	8	8	8	8	7	7	7
20th	9	7	9	8	9	9	7	7	8
10th	9	7	9	8	9	9	8	8	9

Table 36 A, B show the difference of grouping ability between children in the same grade but different schools.

Since types rank 1 to rank 6 increase with grade so they are good types, and, vice versa, types rank 7 to rank 10 are bad types.

Look at the cumulative percentage from category rank 10 up to rank 7, $A_1.a$ has 90.24% of bad types, $A_1.b$ 76.47% D_1 only 60%. So the performances of children in D_1 in average are better than those of $A_1.b$ and $A_1.a$, and those of $A_1.b$ are better than those of $A_1.a$.

Similarly B_2 is better than C_2 .

B_3 is better than C_3 .

A_4 is better than D_4 .

But the types rank 3, 4, 5 are more frequent in C_2 than B_2 and in C_3 than B_3 . So the brighter children of C_2 and C_3 are better than those of B_2 and B_3 in ability to group signs together.

For the difference of grouping ability among children in various grades, see Table 38A.

Look at percentile 50 th or the median. Children in the 7 classes could arrange the signs not better than category rank 7. Only A_4 could reach rank 6; and $A_1.a$ only reached rank 8.

The difference of grouping ability between children in P.II and P.III is not seen clearly from Table 38 A,B. Nevertheless, it indicates that children in P. IV performed very much better than those of P. I.

TABLE 38.A - Cumulative Percentage of Types of Grouping Signs in the
First Sheets of the Four Grades.

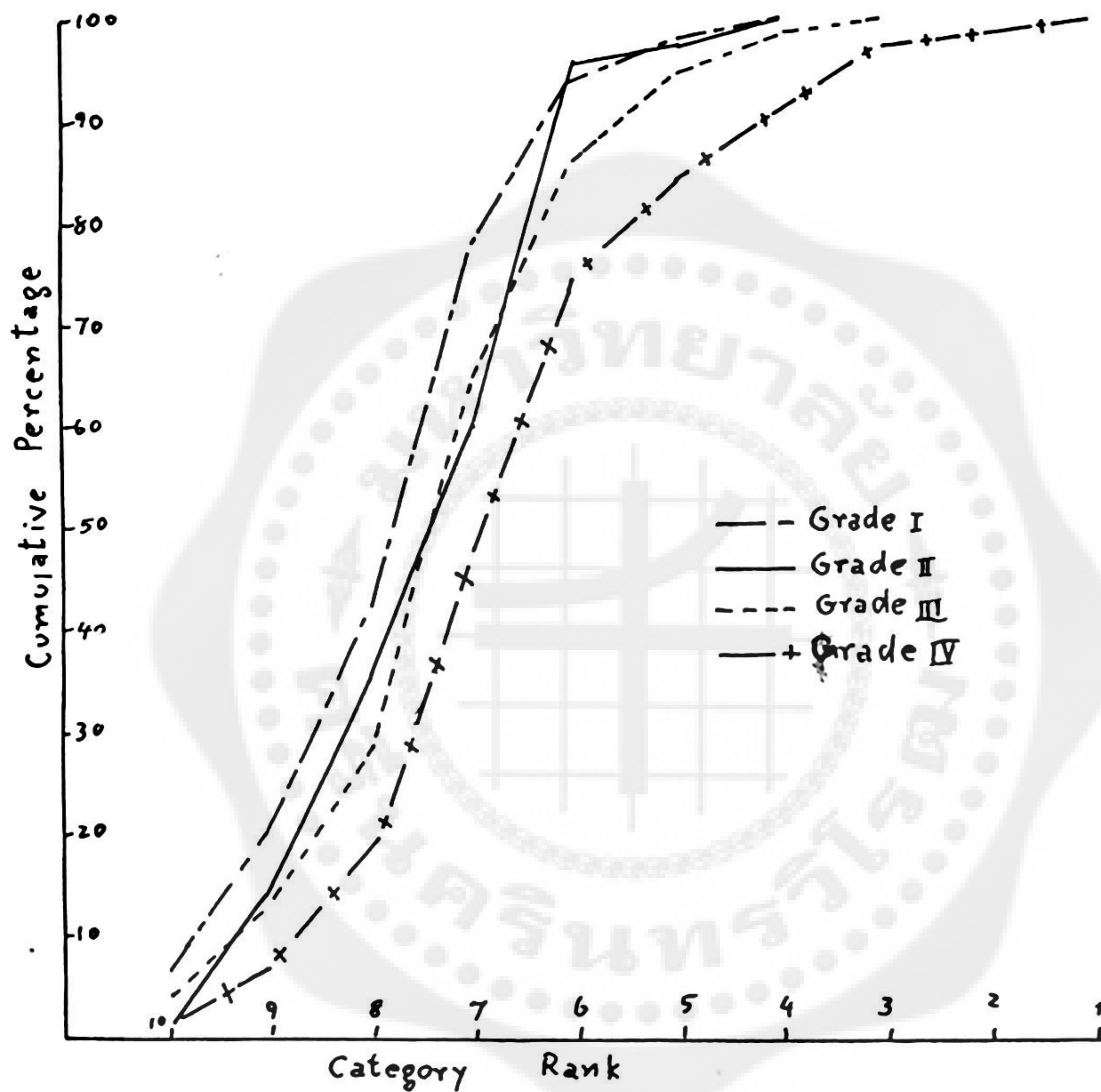
Category Rank	Grade I	Grade II	Grade III	Grade IV
1				100.00
2				98.51
3			100.00	97.02
4	100.00	100.00	98.63	95.53
5	98.10	97.01	94.53	83.59
6	94.28	95.52	86.31	74.63
7	77.14	59.70	64.39	47.76
8	41.90	35.82	28.77	19.40
9	20.95	14.93	13.70	7.46
10	6.67	1.49	4.11	1.49

TABLE 38 B. - Percentiles of the Ten Categories of Grouping Signs in the
First Sheets of the Four Grades.

Grade Percentile	I	II	III	IV
100th	4	4	3	1
95th	5	6	4	4
90th	6	6	5	4
80th	6	6	6	5
70th	7	6	6	6
60th	7	6	7	6
50th	7	7	7	6
40th	8	7	7	7
30th	8	8	7	7
20th	9	8	8	7
10th	9	9	9	8

Figure 39 shows more obviously that the ability increases with grade. This can be seen also if one looks at the cumulative percentage up to rank 7.

FIGURE 39. - Cumulative Percentage Curves of
Type of Grouping Signs in the First Sheets of the Four Grades.



(From data of Table 32)

NOTE. There is no equality of units between the rank of the category. That is only to show that category of the 1st. rank is better than that of the 2nd. rank and so on.

For the six age groups see Table 40 A, B. Group 9/9 - 11/8 is the best and group 4/9 - 6/8 is the worst.

TABLE 40 A. - Cumulative Percentage of Types of Grouping Signs in the First Sheets of the Six Age Groups.

Category Rank	4/9 - 6/8	6/9 - 7/8	7/9 - 8/8	8/9 - 9/8	9/9 - 11/8	11/9 - 14/8
1					100.00	
2				100.00	97.14	
3				98.41	97.14	100.00
4		100.00	100.00	96.82	97.14	96.00
5	100.00	95.00	99.02	85.71	88.57	92.00
6	92.59	91.67	96.08	77.77	80.00	84.00
7	74.07	60.00	72.55	61.90	48.57	56.00
8	48.15	31.67	34.31	33.33	20.00	28.00
9	18.52	13.33	18.63	17.46	5.71	8.00
10	7.41	5.00	3.92	3.17	0.00	4.00

TABLE 40 B. - Percentiles of the Ten Categories of Grouping Signs in the First Sheets of the Six Age Groups.

Percentile	4/9 - 6/8	6/9 - 7/8	7/9 - 8/8	8/9 - 9/8	9/9 - 11/8	11/9 - 14/8
100th	5	4	4	2	1	3
95th	5	5	6	4	4	4
90th	6	6	6	4	4	5
80th	6	6	6	5	6	6
70th	7	6	7	6	6	6
60th	7	7	7	7	6	6
50th	7	7	7	7	7	7
40th	8	7	7	7	8	7
30th	8	8	8	8	8	7
20th	8	8	8	8	8	8
10th	9	9	9	9	8	8

Table 40 A, B : how that the ability to group signs increase with age.

3.2 Classification of Grouping Signs in the Memory Sheets.

TABLE 41. - Percentages of Types of Grouping Signs in Memory Sheets of
the Nine Classes

School and Grade	Realistic 5 - 9 Signs	Realistic 3 - 4 Signs	Symmetrical 5 - 9 Signs	Asymmetrical 5 - 9 Signs	Symmetrical 3 - 4 Signs	Asymmetrical 2 - 4 Signs	Order of Dictation	Framing	Random Order	Helped by Excess Signs
A1a						4.76	28.57	33.33	28.57	4.76
A1b				2.94	0.00	23.53	64.70	0.00	8.82	
D1				3.33	3.33	30.00	23.33	16.67	16.67	6.67
B2						34.38	25.00	28.13	12.50	
C2				6.25	6.25	21.88	43.75	15.63	6.25	
E3					9.38	25.00	31.25	21.88	9.38	3.13
C3				9.76	9.76	14.63	39.02	19.51	4.88	2.44
A4	2.27	2.27	2.27	2.27	13.64	45.45	15.91	11.36	2.27	2.27
D4				8.70	4.35	26.09	21.74	26.09	13.04	

TABLE 42. - Cumulative Percentage of Types of Grouping Signs in Memory
Sheets of the Nine Classes.

Category Rank	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
1								100.00	
2								97.73	
3								95.45	
4		100.00	100.00		100.00		100.00	93.17	100.00
5		97.06	96.67		93.75	100.00	90.24	90.90	91.30
6	100.00	97.06	93.33	100.00	87.50	90.63	80.48	77.26	86.96
7	95.24	73.53	63.33	65.63	65.63	65.63	65.85	31.81	60.87
8	66.66	8.82	40.00	40.63	21.88	34.38	26.83	15.90	39.13
9	33.33	8.82	23.33	12.50	6.25	12.50	7.32	4.54	13.04
10	4.76	0.00	6.67	0.00	0.00	3.13	2.44	2.27	0.00

In memory sheets C₂ and C₃ become alike B₂ and B₃ respectively in average and seems to be a little better because the percentages of 3-4 signs, symmetrical, and 5-9 signs, asymmetrical, of C₂ exceed that of B₂: and C₃ exceed that of B₃.

TABLE 43 A. - Percentages of Types of Grouping Signs in Memory Sheets
of the Four Grades.

Grade	Realistic 5 - 9 Signs	Realistic 3 - 4 Signs	Symmetrical 5 - 9 Signs	Asymmetrical 5 - 9 Signs	Symmetrical 3 - 4 Signs	Asymmetrical 2 - 4 Signs	Order of Dictation	Framing	Random Order	Helped by Excess Signs
I				1.89	0.94	17.92	38.68	17.92	18.87	3.77
II				3.13	3.13	28.13	34.38	21.88	9.38	
III				5.48	9.59	19.18	35.62	20.55	6.85	2.74
IV	1.49	1.49	1.49	4.48	10.45	38.81	17.91	16.42	5.97	1.49

TABLE 43 B. - Cumulation Percentage of Types of Grouping Signs in Memory
Sheets of the Four Grades.

Category Rank	Grade I	Grade II	Grade III	Grade IV
1				100.00
2				98.51
3				97.02
4	100.00	100.00	100.00	95.53
5	98.11	96.88	94.52	91.05
6	97.17	93.75	84.93	80.60
7	79.25	65.63	65.75	41.79
8	40.56	31.25	30.14	23.88
9	22.64	9.38	9.59	7.46
10	3.77	0.00	2.74	1.49

The findings are similar to those of the first sheets, but performances are varied a little.

TABLE 44 A. - Percentages of Types of Grouping Signs in Memory Sheets of the Six Age Groups.

Age	Realistic 5 - 9 Signs	Realistic 3 - 4 Signs	Symmetrical 5 - 9 Signs	Asymmetrical 5 - 9 Signs	Symmetrical 3 - 4 Signs	Asymmetrical 2 - 4 Signs	Order of Dictation	Framing	Random Order	Helped by Excess Signs
4/9 - 6/8					3.70	22.22	33.33	22.22	18.52	
6/9 - 7/8				3.45	0.00	20.69	41.38	12.07	17.24	5.17
7/9 - 8/8				0.98	4.90	23.53	40.20	19.61	9.80	0.98
8/9 - 9/8		1.59		7.94	7.94	15.87	28.57	23.81	11.11	3.17
9/9 - 11/8	2.86			8.57	8.57	37.14	17.14	17.14	8.57	
11/9 - 14/8			4.00		12.00	48.00	12.00	20.00		4.00

TABLE 44 B. - Cumulative Percentages of Types of Grouping Signs in Memory Sheets of the Six Age Groups

Category Rank	4/9 - 6/8	6/9 - 7/8	7/9 - 8/8	8/9 - 9/8	9/9 - 11/8	11/9-14/8
1					100.00	
2				100.00	97.14	
3				98.41	97.14	100.00
4		100.00	100.00	98.41	97.14	96.00
5	100.00	96.55	99.02	90.47	88.57	96.00
6	96.30	96.55	94.12	82.53	80.00	84.33
7	74.07	75.86	70.59	66.66	42.85	36.00
8	40.74	34.48	30.39	38.09	25.71	24.00
9	18.52	22.41	10.78	14.28	8.57	4.00
10	0.00	5.17	0.98	3.17	0.00	4.00

Group 9/9 - 11/8 is still the best of all.

CHAPTER 4

CLASSIFICATION OF SEVEN SPOTS

Considerable attention has been given to the item of seven spots and five lines because their numbers are seven and five instead of one as in other items.

The following is the classification of seven spots into 6 types of arrangement.

Type I Bilateral symmetrical structure

Type II Set into 2 rows

Type III Curved or angled

Type IV Straight line (horizontal or vertical or oblique)

Type V Imperfect symmetrical structure,

(If a certain spots is moved into a right position or removed away, the structure will be symmetrical.)

Type VI Original or unrecognizable structure.

In some cases the seven spots of this type are scattered among other signs or used to decorate other signs. (See type IIIIC, Appendix V, figure IIIIC.7, and type VB, figures VB.1, VB.3 and VB.4)

Examples of these types are shown in Appendix VII.

4.1 CLASSIFICATION OF SEVEN SPOTS IN THE FIRST SHEETS

TABLE 46A Percentage Distribution of the Six Types of Seven Spots in the First Sheets of the Nine Classes.

School and Grade	Type I	Type II	Type III	Type IV	Type V	Type VI
A1a	2.44	2.44	0.00	92.68	0.00	2.44
A1b	0.00	0.00	11.76	79.41	2.94	5.88
D1	3.33	6.67	0.00	83.33	0.00	6.67
B2	14.29	8.57	2.86	54.29	17.14	2.86
C2	21.88	0.00	6.25	37.50	15.63	18.76
B3	12.50	15.63	3.13	59.38	3.13	6.25
C3	20.00	17.50	7.50	40.00	12.50	2.50
A4	20.45	11.36	11.36	40.90	2.27	13.64
D4	26.09	4.35	0.00	30.44	13.04	26.09

Type IV is the most common in all classes. The vast majority of this type are in horizontal plane.

TABLE 46B Percentage Distribution of the Six Types of Seven Spots in the First Sheets of the Four Grades

Grade \ Type	I	II	III	IV	V	VI
I	1.90	2.86	3.81	85.72	0.95	4.76
II	17.91	4.48	4.48	46.27	16.42	10.45
III	16.67	16.67	5.56	48.61	8.33	4.17
IV	22.39	8.96	7.46	37.31	5.97	1.91

Table 46B shows that types I, II, and III increase with grade while types IV, and V decrease with grade. To differentiate which type is the best and which is not good, the assumption is the same as had been stated in the classification of grouping signs (page 35). This means that the more complicated type will appear less in lower grades than in higher grades and the simpler type will appear more frequently in lower grades.

The calculation to determine the rank of complicity of the six types yields the following results:

<u>Rank of Complicity</u>	<u>Type of the arrangement</u>
1.	Original (Type VI)
2	Symmetrical (Type I)
3	Two rows (Type II)
4	Curved (Type III)
5	Straight line (Type IV)
6	Imperfect symmetrical (Type V)

TABLE 47 - Cumulative Percentages of Types of Seven Spots in the First Sheets of the Nine Classes.

Type	Rank	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	B ₄
VI	1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
I	2	97.56	94.12	93.33	97.14	81.25	93.75	97.50	86.36	73.91
II	3	95.12	94.12	90.00	82.86	59.38	81.25	77.50	65.91	47.83
III	4	92.68	94.12	83.33	74.29	59.38	65.63	60.00	54.55	43.48
IV	5	92.68	82.35	83.33	71.43	53.13	62.50	52.50	43.18	43.48
V	6	0.00	2.94	0.00	17.14	15.63	3.13	12.50	2.27	13.04

Types IV, and V decrease with grade (see Table 46 B) so they are simpler and easier than the others. Look at the cumulative percentage up to rank 5, the average performance of children in Alb is a little better than that of D₁, and D₁ better than Ala respectively. C₂ and C₃ are better than B₂ and B₃ respectively, like the findings from Table 42. A₄ is again a little better than D₄. Type rank 1 (original) and rank 2 (symmetrical) are more frequent in School D than in School A, and in C₂ than in B₂. Type rank 1 is also found in C₃ more than in B₃. (See Table 46A.)

TABLE 48 - Cumulative Percentage of Types of Seven Spots in the First Sheets of the Four Grades.

Type	Rank	Structure	Grade I	Grade II	Grade III	Grade IV
VI	1	Original	100.00	100.00	100.00	100.00
I	2	Symmetrical	95.24	89.55	95.83	82.09
II	3	Two rows	93.34	71.64	79.17	59.70
III	4	Curved	90.48	67.16	62.50	50.74
IV	5	Straight	86.67	62.69	56.94	43.28
V	6	Imp. symm.	0.95	16.42	8.33	5.97

The ability to arrange seven spots into good structure increase with grade. But children of Pratom III seem to be inferior to those of Pratom II as seen in the original type, the symmetrical type and they also had more straight line type than Pratom II. Nevertheless, for average value, the good types (I, II, III and VI) of P. I is 13.33%, of P. II is 37.31%, of P. III is 43.06% and of P. IV is 56.72%.

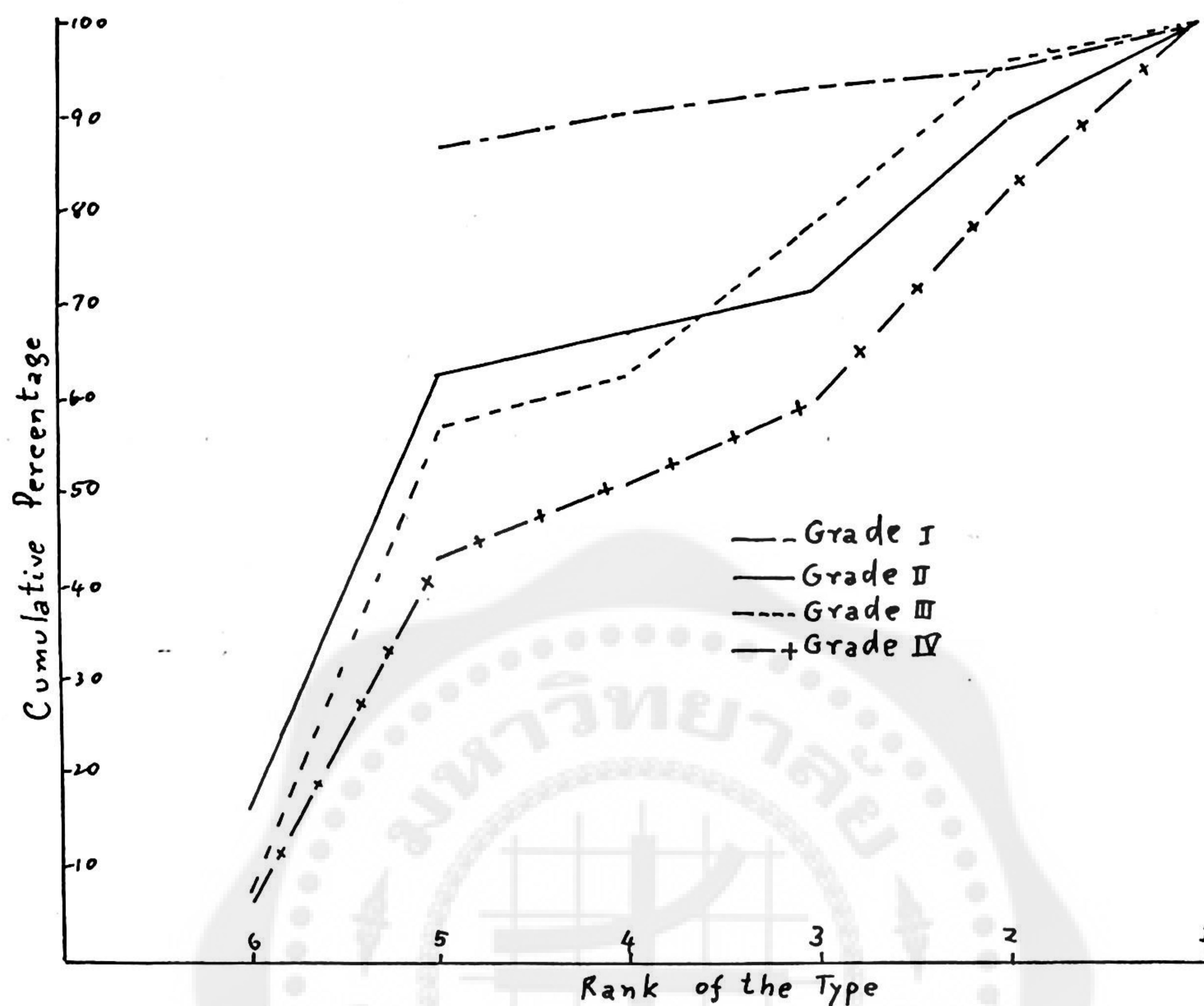


Fig. 49. Cumulative Percentage Curves of the Six Types of Seven Spots in the First Sheets of the Four Grades. (From data of Table 48)

Note: Rank 6 (imperfect symmetrical structure) firstly develops in Pratom II.

If study in the six age groups, the result is as follows:

TABLE 49. Percentage Distribution of the Six Types of Seven Spots in the First Sheets of the Six Age Groups.

Type \ Age	I	II	III	IV	V	VI
4/9 - 6/8		7.41	3.70	77.78		11.11
6/9 - 7/8	10.00	3.33	3.33	75.00	3.33	5.00
7/9 - 8/8	10.89	7.92	5.94	61.39	8.91	4.95
8/9 - 9/8	20.63	7.94	1.59	42.86	15.87	11.11
9/9 - 11/8	20.00	14.29	8.57	40.00		17.14
11/9 - 14/8	16.00	8.00	12.00	48.00	4.00	12.00

Age group 9/9 - 11/8 is again the best group.

TABLE 50. - Cumulative Percentage of the Six Types of Seven Spots in the First Sheets of the Six Age Groups.

Rank	Structure	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
1	Original	100.00	100.00	100.00	100.00	100.00	100.00
2	Symmetrical	88.89	95.00	95.05	88.89	82.86	88.00
3	Two rows	88.89	85.00	84.16	68.26	62.86	72.00
4	Curved	81.48	81.67	76.24	60.32	48.57	64.00
5	Straight	77.78	78.33	70.30	58.73	40.00	52.00
6	Imp. Symm.	0.00	3.33	8.91	15.87	0.00	4.00

The ability also increases with age in general.

4.2 CLASSIFICATION OF SEVEN SPOTS IN THE MEMORY SHEETS

Most of children arranged seven spots in memory sheets, ⁱⁿ the same ^{way} as in sheets I. Some children forgot this item and some did it incompletely. The incomplete number of this item frequently is five, which shows ^{the} influence of the number of lines in ^{the} item of five lines. Few subjects drew incomplete number of 6 and only one subject in Alb drew 3 spots in his memory sheets.

TABLE 51. - Percentage Distribution of the Six Types of Seven Spots in the Memory Sheets of the Nine Classes.

School and Grade	I	II	III	IV	V	VI
A1a				100.00		
Alb				93.10	3.45	3.45
D1	3.57	3.57	7.14	82.14		3.57
B2	21.74	8.70	4.35	56.52	4.35	4.35
C2	20.00	6.67	3.33	33.33	16.67	20.00
B3	13.33	13.33	3.33	60.00	3.33	6.67
C3	18.92	18.92	10.81	40.54	5.41	5.41
A4	20.45	11.36	4.55	52.27	4.55	6.82
D4	19.05	4.76		33.33	19.05	23.81

TABLE 52A- Cumulative Percentage of the Types of Seven Spots in the Memory
Sheets of the Nine Classes.

Type	Rank	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
VI	1		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
I	2		96.55	96.43	95.65	80.00	93.33	94.59	93.18	76.19
II	3		96.55	92.86	73.91	60.00	80.00	75.68	72.73	57.14
III	4		96.55	89.29	65.22	53.33	66.67	56.76	61.37	52.38
IV	5	100.00	96.55	82.14	60.87	50.00	63.33	45.95	56.82	52.38
V	6	0.00	3.45	0.00	4.35	16.67	3.33	5.41	4.55	19.05

Look at the cumulative percentage of the last two ranks. D₁ has the lowest percentage in grade I, C₂ has less than B₂; C₃ has less than B₃ and D₄ than A₄. This shows the average of the bad types or simpler types. D₄ has the highest percentage (23.81%) of the best types (original); and the lowest percentage of the straight line type which is the most common type in every class.

TABLE 52B - Percentage Distribution of the Six Types of Seven Spots in the
Memory Sheets of the Four Grades.

Grade	Type I	Type II	Type III	Type IV	Type V	Type VI
I	1.11	1.11	2.22	92.22	1.11	2.22
II	20.75	7.55	3.77	43.40	11.32	13.21
III	16.42	16.42	7.46	49.25	4.48	5.97
IV	20.00	9.23	3.08	46.16	9.23	12.31

TABLE 53 - Cumulative Percentage of the Six Types of Seven Spots in the
Memory Sheets of the Four Grades.

Type	Rank	Structure	Grade I	Grade II	Grade III	Grade IV
VI	1	Original	100.00	100.00	100.00	100.00
I	2	Symmetrical	97.78	86.79	94.03	87.69
II	3	Two rows	96.67	66.04	77.61	67.69
III	4	Curved	95.56	58.49	61.19	58.46
IV	5	Straight	93.33	54.72	53.73	55.38
V	6	Imp. Sym.	1.11	11.32	4.48	9.23

The imperfect Symmetrical structure should increase with grade but it does not appear so in the first sheets; but in the memory sheets it has a tendency to be so if not because of 16.67% of B₂. It is also interesting to note that this type is abundant in the first sheets of P.II of both schools. This type may be of a better rank if the investigation covers more schools than this.

The result of classification of grouping signs also shows that the sample should have more quantity than what has been done so that the norming of data will be more reliable.

TABLE 54A - Percentage Distribution of the Six Types of Seven Spots in the Memory Sheets of the Six Age Groups.

Age \ Type	I	II	III	IV	V	VI
4/9 - 6/8		4.17	4.17	87.50		4.17
6/9 - 7/8	6.25	4.17	2.08	75.00	4.17	8.34
7/9 - 8/8	14.78	10.23	4.55	62.50	3.41	4.55
8/9 - 9/8	17.86	5.36	3.57	46.43	14.29	12.50
9/9 - 11/8	14.71	8.82	8.82	50.00	5.88	11.76
11/9 - 14/8	20.00	16.00		56.00	4.00	4.00

TABLE 54B - Cumulative Percentage of the Six Types of Seven Spots in the Memory Sheets of the Six Age Groups.

Rank	Structure	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
1	Original	100.00	100.00	100.00	100.00	100.00	100.00
2	Symmetrical	95.83	91.67	95.45	87.50	88.24	96.00
3	Two rows	95.83	85.42	80.68	69.64	73.53	76.00
4	Curved	91.67	81.25	70.45	64.29	64.71	60.00
5	Straight	87.50	79.17	65.91	60.72	55.88	60.00
6	Imp. Symm.	0.00	4.17	3.41	14.29	5.88	4.00

CHAPTER 5

CLASSIFICATION OF FIVE LINES

From a descriptive point of view, the arrangement of the item of five lines can be divided into 6 types.

Type I One row

The five lines may be parallel in horizontal or vertical or oblique plane: or they may be continued, with a little gap between one another in the same line.

Type II Parallel with gradually increasing or decreasing length at both extremities.

They may be horizontal or vertical or oblique parallel. The increased or decreased length at the two extremities may either be equal or not equal.

Type III Parallel with gradually increasing or decreasing length at only one extremity.Type IV Original or which does not belong to any other types described here.

Type V Framing other signs as has been described in the classification of grouping signs type IV and types I, II, III whenever the lines are used as frame. They may be accompanied by the first two lines also.

Type VI Realistic or representing real object. They may be accompanied by the first two lines or other items.

Examples of all types are shown in Appendix D..

TABLE 56A - Percentage Distribution of the Six Types of Five Lines in the First Sheets of the Nine Classes.

Type School & Grade	I	II	III	IV	V	VI
A _{1a}	82.50	2.50			15.00	
A _{1b}	85.30	5.88		8.82		
D ₁	90.00			6.67	3.33	
B ₂	65.71	2.86	5.71	20.00	5.71	
C ₂	56.25	6.25	15.63	18.76		3.13
B ₃	62.50	6.25	9.38	18.75	3.13	
C ₃	56.41	5.13	7.69	28.21	2.56	
A ₄	65.91	6.82	4.55	9.09	9.09	4.55
D ₄	17.39	8.70	8.70	47.83	13.04	4.35

Type I is the most common in every class. The vast majority of this type are horizontal parallel and only very few are oblique parallel.

TABLE 56 B. - Percentage Distribution of the Six Types of Five Lines in the First Sheets of the Four Grades.

Type Grade	I	II	III	IV	V	VI
I	85.58	2.88		4.81	6.73	
II	61.19	4.48	10.45	19.41	2.99	1.49
III	59.15	5.63	8.45	23.95	2.82	
IV	49.25	7.46	5.97	22.39	10.45	4.48

Type I, one row, decreases with grade. Type II, IV, VI increase with grade. Type III does not yet develop in Pratom I and firstly appears in Pratom II and then decreases with grade. Type V is less frequent in P. II, P. III than in P. I, P. IV.

To differentiate which is ^agood type and which is ^asimple type, the same assumption as in the classification of grouping signs is taken.

Pratom I, Pratom II, Pratom III.

The ranks of the six types in an ordered sequence with respect to their complicacy are as follows.

<u>Rank</u>	<u>Structure</u>	<u>Type</u>
1	Realistic	VI
2	Original	IV
3	Successive length: both ends	II
4	Framing	V
5	One row	I
6	Successive length: one end	III

TABLE 57. Cumulative Percentage of the Six Types of Five Lines in the First Sheets of the Nine Grades.

Type	Rank	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
VI	1					100.00			100.00	100.00
IV	2		100.00	100.00	100.00	96.88	100.00	100.00	95.45	95.65
II	3	100.00	91.18	93.33	80.00	78.13	81.25	71.79	86.36	47.83
V	4	97.50	85.30	93.33	77.14	71.88	75.00	66.66	79.54	39.13
I	5	82.50	85.30	90.00	71.43	71.88	71.88	64.10	70.45	26.09
III	6	0.00	0.00	0.00	5.71	15.63	9.38	7.69	4.55	8.70

Look at the cumulative percentage up to rank 5, D_1 has the highest percentage of bad types (90.00 %) for grade I: B_2 and C_2 have the same level, the arrangement of five lines by children in C_3 is better than B_3 : and D_4 is remarkably better than A_4 .

TABLE 58. - Cumulative Percentage of the Six Types of Five Lines in the First Sheets of the Four Grades.

Type	Rank	Grade I	Grade II	Grade III	Grade IV
VI	1	100.00	100.00	100.00	100.00
IV	2	100.00	98.51	100.00	95.52
II	3	95.19	79.10	76.05	73.13
V	4	92.31	74.63	70.42	65.67
I	5	85.58	71.64	67.60	55.22
III	6		10.45	8.45	5.97

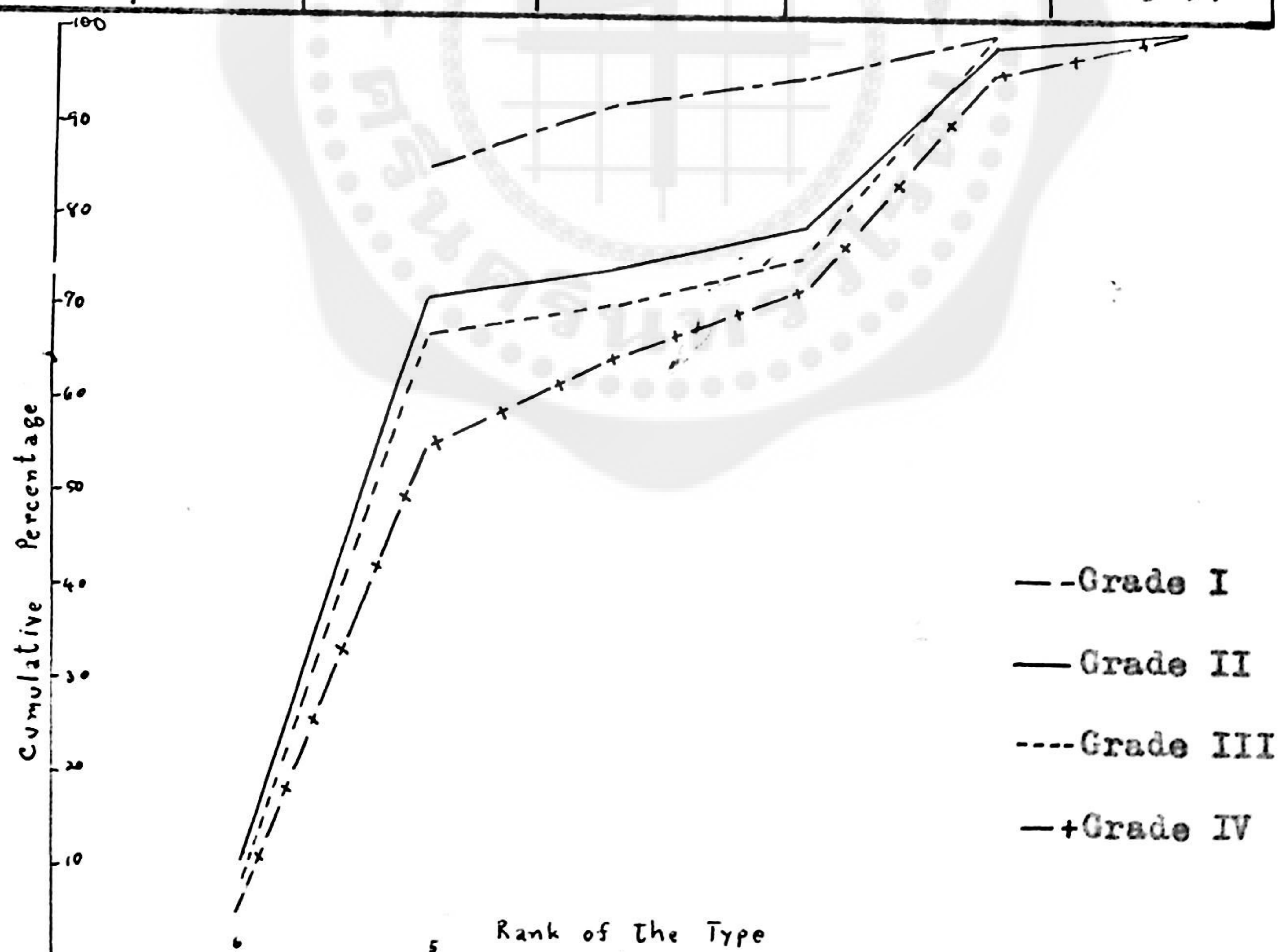


Fig. 58 Cumulative Percentage Curves of the Six Types of Five Lines in the First Sheets of the Four Grades. (From data of Table 58.)

Grade III has no realistic type; Grade II has one subject of C₂ (No. 27) who drew a house with a triangle and five lines. This should not be considered because it has a window and a door which are excess signs. But this type of realistic arrangement is very rare, so the investigator includes it in this type.

In general, the percentage of good types increases with grade and that of bad types decreases with grade. This also appears from the age groups 6/9-7/8 to age group 8/9-9/8. (See Table 60).

TABLE 59. - Percentage Distribution of the Six Types of Five Lines in the First Sheets of the Six Age Groups.

Age \ Type	I	II	III	IV	V	VI
4/9 - 6/8	84.62	3.85		7.69	3.85	
6/9 - 7/8	81.67	3.33	3.33	8.33	1.67	1.67
7/9 - 8/8	66.34	5.94	6.93	15.84	4.95	
8/9 - 9/8	43.55	3.23	9.67	33.88	8.06	1.61
9/9 - 11/8	54.28	11.43	2.86	14.29	11.43	5.71
11/9 - 14/8	84.00		4.00	4.00	8.00	

The trend of each type is not clear as when working with grades. The realistic type (type rank 1) and type II (rank 3) are most frequent in the age group 9/9 - 11/8. The original type (rank 2) is most frequent in age group 8/9 - 9/8. One row type is most frequent in age group 4/9 - 6/8 as well as in age group 11/9 - 14/8.

TABLE 60. - Cumulative Percentage of the Six Types of Five Lines in the
First Sheets of the Six Age Groups.

Type	Rank	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
VI	1		100.00		100.00	100.00	
IV	2	100.00	98.33	100.00	98.39	94.29	100.00
II	3	92.31	90.00	84.16	64.51	80.00	96.00
V	4	88.47	86.67	78.22	61.28	68.57	96.00
I	5	84.62	85.00	73.27	53.22	57.14	88.00
III	6		3.33	6.93	9.67	2.86	4.00

5.2 CLASSIFICATION OF FIVE LINES IN THE MEMORY SHEETS

The first and the second items are also lines. Sometimes it is difficult to discriminate those items from the item of five lines. In such a case, if the number of lines in that sheet is less than seven, it was assumed that the first and the second items are presented and the item of five lines is incomplete. The incomplete five lines were classified too if the type still could be recognized. That is, for examples, if there is only one line, the classification is impossible; if there are only 2 lines, it can not belong to type II or type III. If five lines were drawn prominently not confusing with the first and the second items, there was no problem of classification even when the first one or two lines were forgotten. This rule was also practised when all signs were checked.

Most of the children arranged five lines in memory sheets in the same way as in the first sheets.

TABLE 61. - Percentage Distribution of the Six Types of Five Lines in the Memory Sheets of the Nine Classes.

School and Grade \ Type	I	II	III	IV	V	VI
A1a	73.68	7.89	5.26		13.16	
A1b	96.30	3.70				
D1	92.86			7.14		
B2	58.06	9.68	9.68	19.35	3.23	
C2	70.37	3.70	7.41	18.52		
B3	70.97	3.23	6.45	16.13	3.23	
C3	57.50	2.50	5.00	25.00	10.00	
A4	65.11	13.95	2.33	6.98	4.65	6.98
D4	14.29	9.52	9.52	47.62	9.52	9.52

TABLE 62 A. - Percentage Distribution of the Six Types of Five Lines in the
Memory Sheets of the Four Grades.

Type Grade	I	II	III	IV	V	VI
I	86.02	4.30	2.15	2.15	5.38	
II	63.80	6.90	8.62	18.97	1.72	
III	63.38	2.82	5.63	21.14	7.04	
IV	48.44	12.50	4.69	20.32	6.25	7.81

TABLE 62 B. - Cumulative Percentage of the Six Types of Five Lines in the
Memory Sheets of the Nine Classes.

Type	Rank	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
VI	1								100.00	100.00
IV	2			100.00	100.00	100.00	100.00	100.00	93.02	90.48
II	3	100.00	100.00	92.86	80.65	81.48	83.87	75.00	86.04	42.86
V	4	92.11	96.30	92.86	70.97	77.78	80.65	72.50	72.09	33.33
I	5	78.95	96.30	92.86	67.74	77.78	77.42	62.50	67.44	23.81
III	6	5.26			9.68	7.41	6.45	5.00	2.33	9.52

TABLE 63 A. - Cumulative Percentage of the Six Types of Five Lines in the
Memory Sheets of the Four Grades.

Type	Rank	Grade I	Grade II	Grade III	Grade IV
VI	1				100.00
IV	2	100.00	100.00	100.00	92.19
II	3	97.85	81.03	78.87	71.88
V	4	93.55	74.14	76.06	59.38
I	5	88.17	72.42	69.01	53.13
III	6	2.15	8.62	5.63	4.69

TABLE 63 B. - Percentage Distribution of the Six Types of Five Lines in
Memory Sheets of the Six Age Groups.

Type Age	I	II	III	IV	V	VI
4/9 - 6/8	86.96		4.35	8.70		
6/9 - 7/8	87.04	1.85	1.85	5.56	3.70	
7/9 - 8/8	68.48	5.43	7.61	14.13	4.35	
8/9 - 9/8	41.67	8.33	6.67	30.00	10.00	3.33
9/9 - 11/8	58.82	14.71	2.94	11.76	5.88	5.88
11/9 - 14/8	78.26	8.70		4.35	4.35	4.35

TABLE 64. Cumulative Percentage of the Six Types of Five Lines in Memory
Sheets of the Six Age Groups.

Type	Rank	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
VI	1				100.00	100.00	100.00
IV	2	100.00	100.00	100.00	96.67	94.12	95.65
II	3	91.30	94.44	85.87	66.67	82.35	91.30
V	4	91.30	92.59	80.44	58.34	67.65	82.61
I	5	91.30	88.89	76.09	48.34	61.77	78.26
III	6	4.35	1.85	7.61	6.67	2.94	0.00

CHAPTER 6

CLASSIFICATION OF THE USE OF SPACE

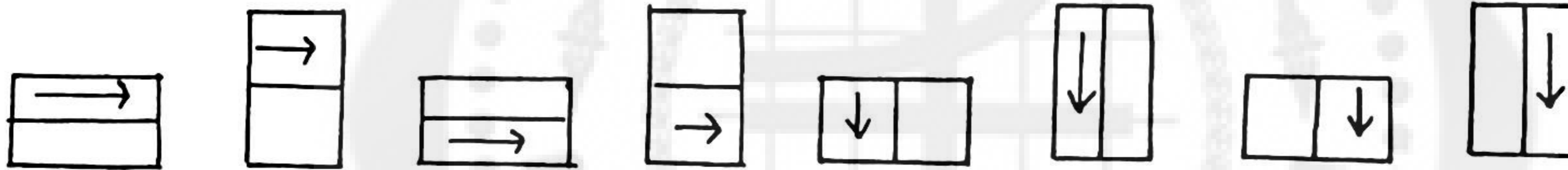
There are 4 main types in the use of space.

Type I Using the whole page.

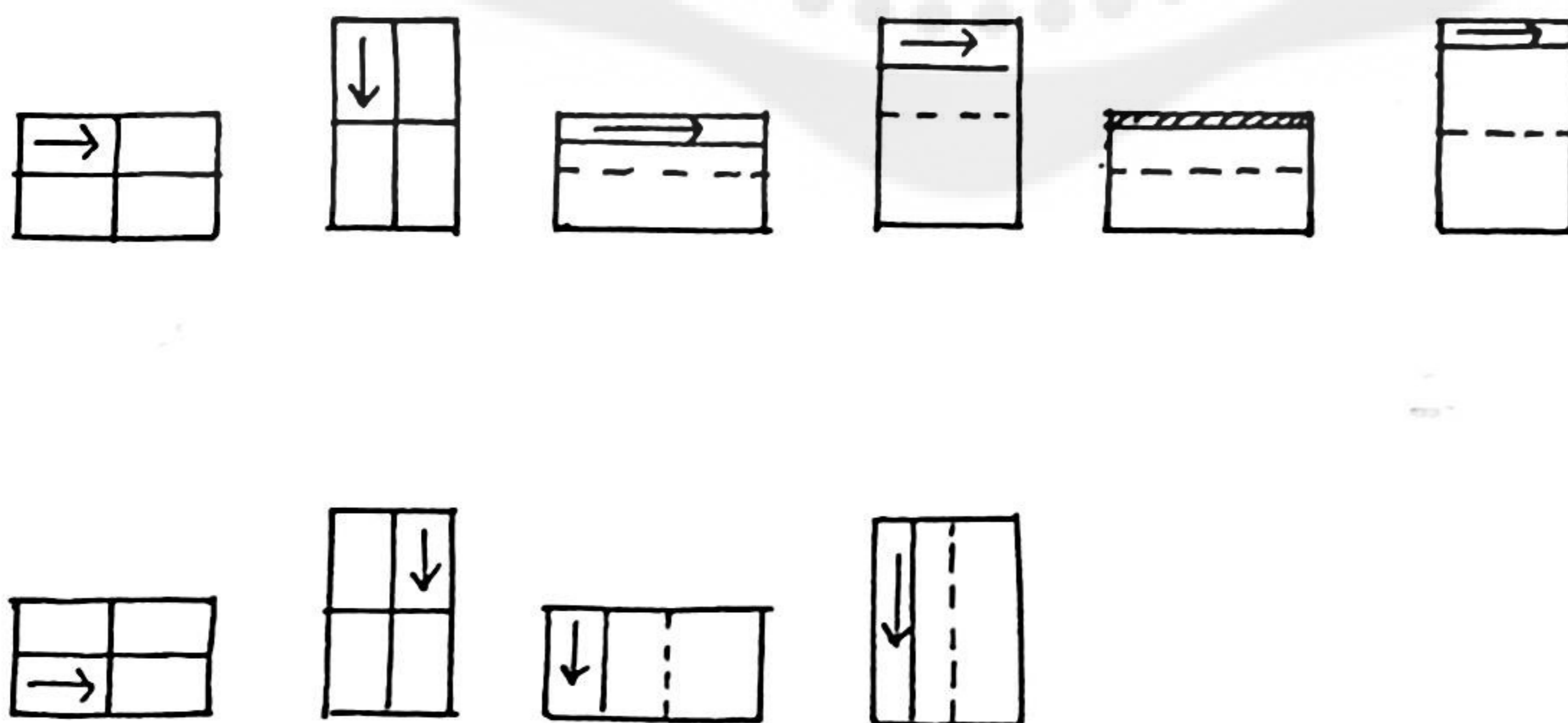
In this type, the subjects usually started out with long lines running across the papers and drew those successive signs on the parts of the papers which they had not yet covered.

Type II Using the centre of the page and leaving a free space around.

Type III Using half of the page.



Type IV Using one quarter of the page or less than one quarter.



6.1 CLASSIFICATION OF THE USE OF SPACE IN THE FIRST SHEETS.

TABLE 66A - Percentage Distribution of Different Uses of Space in the First Sheets of the Nine Classes.

Type School and Grade	I Whole	II Centre	III Half	IV Quarter
A1a	53.66	14.63	31.71	
A1b	14.71	11.76	32.35	41.18
D1	86.67	3.33	6.67	3.33
B2	40.00	5.71	34.29	20.00
C2	56.25	18.75	18.75	6.25
B3	53.13	6.25	18.75	21.88
C3	31.71	17.07	39.02	12.20
A4	31.82	11.36	50.00	6.82
D4	26.09	26.09	30.43	17.39

A1a has no type IV but A1b has the highest percentage of this type. In every grade, there are great differences between percentages of different uses of space of the two schools.

The trend of each type is shown in Table 66B. Type II and Type III increase with grade but type I and type IV decrease with grade.

TABLE 66B - Percentage Distribution of Different Uses of Space in the First Sheets of the Four Grades.

Type Grade	I Whole	II Centre	III Half	IV Quarter
I	50.48	10.48	24.76	14.29
II	47.76	11.94	26.87	13.43
III	41.10	12.33	30.14	16.44
IV	29.85	16.42	43.28	10.45

Type II and type III are good because they increase with grade. Type III belongs to the first rank because it shows steps of development distinctly. Type I and IV are not good because they decrease with grade. (Calculation ranks of the 4 type like that explained in page 35.)

Rank of Good Organization

Types of Using of Space

1	Type III, using half page
2	Type II, using the centre
3	Type IV, using only one quarter
4	Type I, using whole page

TABLE 67. Percentage Distribution of Different Uses of Space in the First Sheets of the Six Age Groups.

Type Age	I Whole	II Centre	III Half	IV Quarter
4/9 - 6/8	66.67	11.11	18.52	3.70
6/9 - 7/8	55.00	6.67	25.00	13.33
7/9 - 8/8	42.16	13.73	25.49	18.62
8/9 - 9/8	34.92	14.29	38.10	12.70
9/9 - 11/8	28.57	17.14	37.14	17.14
11/9 - 14/8	36.00	12.00	48.00	4.00

Type I decrease gradually from the age group 4/9 - 6/8 to the group 9/9 - 11/8. Type II tends to increase with age but is not seen as clearly as Type III. Type IV increases at the first three age groups but decreases at the last three groups.

TABLE 68A. Cumulative Percentage of Different Uses of Space in the First Sheets of the Nine Classes.

Type	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
Half	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Centre	68.29	67.65	93.33	65.71	81.25	81.25	60.98	50.00	69.57
Quarter	53.66	55.89	90.00	60.00	62.50	75.00	43.91	38.64	43.43
Whole	53.66	14.71	86.67	40.00	56.25	53.13	31.71	31.82	26.09

TABLE 68B. Cumulative Percentage of Different Uses of Space in the First Sheets of the Four Grades.

Type	Grade I	Grade II	Grade III	Grade IV
Half	100.00	100.00	100.00	100.00
Centre	75.24	73.13	69.86	56.72
Quarter	64.76	61.19	57.53	40.30
Whole	50.43	47.76	41.10	29.85

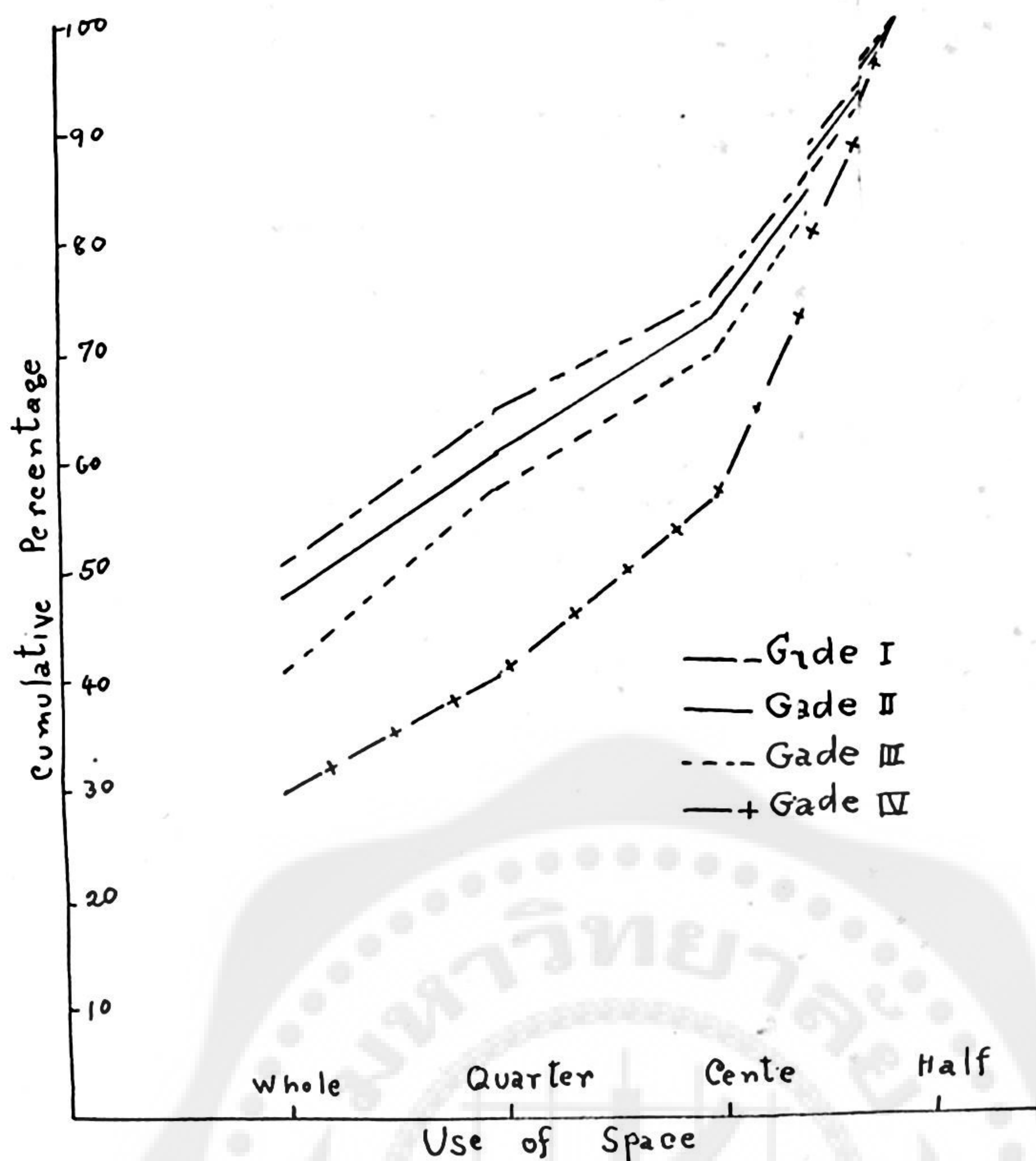


Fig. 69. Cumulative Percentage Curves of the Use of Space in the First Sheets of the Four Grades. (From data of Table 68B).

TABLE 69. Cumulative Percentage of Different Uses of Space in the First Sheets of the Six Age Groups.

Type	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
Half	100.00	100.00	100.00	100.00	100.00	100.00
Centre	81.48	75.00	74.51	61.90	62.86	52.00
Quarter	70.37	68.33	60.78	47.62	45.71	40.00
Whole	66.67	55.00	42.16	34.92	28.57	36.00

6.2 CLASSIFICATION OF THE USE OF SPACE IN THE MEMORY SHEETS

Most of the subjects remembered well how they used the space in the first sheets.

TABLE 70A - Percentage Distribution of Different Uses of Space in the Memory Sheets of the Nine Classes.

Type School and Grade	Whole	Centre	Half	Quarter
A1a	28.57	19.05	42.86	9.52
A1b		11.76	8.82	79.41
D1	56.67	3.33	33.33	6.67
B2	12.50	15.63	43.75	28.13
C2	50.00	9.38	28.13	12.50
B3	31.25	12.50	31.25	25.00
C3	24.39	14.63	39.02	21.95
A4	20.46	22.73	38.64	18.18
D4	21.74	13.04	47.83	17.39

TABLE 70B - Percentage Distribution of Different Uses of Space in the Memory Sheets of the Four Grades.

Type Grade	Whole	Centre	Half	Quarter
I	27.35	12.26	29.25	31.14
II	31.25	12.50	35.94	20.31
III	27.40	13.70	35.62	23.29
IV	20.90	19.40	41.79	17.91

TABLE 71A - Percentage Distribution of Different Uses of Space in the
Memory Sheets of the Six Age Groups.

Type Age	Whole	Centre	Half	Quarter
4/9 - 6/8	44.44		37.04	18.52
6/9 - 7/8	25.86	17.24	29.31	27.59
7/9 - 8/8	22.55	13.73	34.31	29.41
8/9 - 9/8	31.75	14.29	34.92	19.05
9/9 - 11/8	14.29	14.29	45.71	25.71
11/9 - 14/8	32.00	24.00	32.00	12.00

TABLE 71B - Cumulative Percentage of Different Uses of Space in the
Memory Sheets of the Nine Classes.

Type	A _{1a}	A _{1b}	D ₁	B ₂	C ₂	B ₃	C ₃	A ₄	D ₄
Half	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Centre	57.14	91.18	66.67	56.25	71.88	68.75	60.97	61.36	52.17
Quarter	38.09	79.41	63.34	40.63	62.50	56.25	46.34	38.64	39.13
Whole	28.57	0.00	56.67	12.50	50.00	31.25	24.39	20.46	21.74

TABLE 72A - Cumulative Percentage of Different Uses of Space in the
Memory Sheets of the Four Grades.

Type	Grade I	Grade II	Grade III	Grade IV
Half	100.00	100.00	100.00	100.00
Centre	70.75	64.06	64.38	58.21
Quarter	58.49	51.56	50.69	38.81
Whole	27.35	31.25	27.40	20.90

TABLE 72B - Cumulative Percentage of Different Uses of Space in the
Memory Sheets of the Six Age Groups.

Type	4/9-6/8	6/9-7/8	7/9-8/8	8/9-9/8	9/9-11/8	11/9-14/8
Half	100.00	100.00	100.00	100.00	100.00	100.00
Centre	62.96	70.69	65.69	65.08	54.29	68.00
Quarter	62.96	53.45	51.96	50.79	40.00	44.00
Whole	44.44	25.86	22.55	31.75	14.29	32.00

SUMMARY

The Drawing Dictation Test is a simple test which can be applied to adults as well as to children. In adults, drawing simple signs after dictation may lead to different integrated graphic organizations. The data so far obtained from nine elementary classes of children in Bangkok reveal that children like to place the signs separately from each other. The more common patterns of the organization are asymmetrical patterns of 2 - 4 signs, using lines as frame of other signs and placing all signs in order of the dictation. The most typical arrangement of seven spots is a straight row and of five lines which are parallel to and in equal distance from each other.

About the using of space in the first sheets, approximately half of children in P. I and P. II liked to cover the whole page while the more common use of space of children in P. III are whole page and half page and that of P. IV is half page.

Most children remembered the nine signs and the way they drew it in the first sheets well, but the forgetting of some signs and their actual places makes the percentage of the types more or less vary from those of the first sheets. In general, the organization of signs in the first sheets are better than in the memory sheets.

The developmental trends are seen clearer when working with grade I to grade IV than when working with the six age groups. The average performances of children in each pair of schools under investigation are not the same because the background of their pupils are different, especially between school A and school D. But the whole range of each grade shows a trend of creative imagination development which includes perceptual development as well.

APPENDIX I

International Institute for Child Study, Bangkok

Drawing Dictation.

Material: empty sheet, pencils (black) Lyra No. 2, no rubbers, light cardboard as pad.

Instructions: ให้ทุกคนเขียนชื่อ นามสกุล ชั้น และวันที่ลงบนหัวกระดาษ คราวนี้
เรามาเล่นอย่างอื่นกันเถอะ ครูจะบอกให้เธอทำที่ละอย่าง ทั้งให้ที ๆ แล้วทำเร็ว ๆ
นะ ทั้งครูพูดให้จบก่อนคอยทำ จะใคร่วาดรูปอะไรบางอย่าง เขาใจหรือยัง

๑. ลากเส้น ๆ หนึ่งลงบนกระดาษของเธอ จะยาวเท่าไรและอยู่ตรงไหนก็ได้
เสร็จแล้วหรือ ก็มาก
๒. ลากเส้นอีกเส้นหนึ่ง จะยาวเท่าไรและอยู่ตรงไหนก็ได้ก็อีกเหมือนกัน
๓. เขียนวงกลมวงหนึ่ง จะเขียนไว้ตรงไหนและจะใหญ่ เล็กแค่ไหนก็ได้ตามใจ
เธอ
๔. เขียนรูปสามเหลี่ยมรูปหนึ่ง ตรงไหนก็ได้
๕. เขียนจุด ๗ จุดลงบนกระดาษ เธอจะจุดตรงไหนก็ได้
๖. เขียนกากะบาทหนึ่ง ตรงไหนก็ได้
๗. ลากเส้น ๕ เส้น เธอจะจัดวางเส้นอย่างไรก็ได้ตามใจเธอ
๘. เขียนรูปสี่เหลี่ยมรูปหนึ่ง จะวางรูปตรงไหนก็ได้
๙. เขียนชื่อของเธอลงไว้ที่ไหนก็ได้

As soon as this is finished, collect the sheets. Don't give too much time, but press the children to make quickly.

When all the sheets are collected, give new sheets and say:

เขียนชื่อ, นามสกุล ลงบนหัวกระดาษทุกคน เสร็จหรือยัง
ต่อไปนี้ ให้เธอพยายามวาดลงบนกระดาษแผ่นใหม่นี้ก็ทำ ทำอย่างเดียวกับที่เธอทำ
ไว้ในกระดาษแผ่นเมื่อครั้งนี้นี้ แต่คราวนี้ ครูจะไม่บอกอะไร เธอเลย เธอต้องนึกเอาเอง
ว่า เมื่อใดเธอวาดอะไรลงไปแล้วบ้าง วาดลงไปอย่างไร และวาดลงตรงไหน นึก

ดูให้ถี่ ๆ แล้ววาดลงในแผ่นนี้ให้เหมือนกับแผ่นเมื่อครั้งก่อนทุกอย่างที่เขียว

Time for this second experiment: 5'.

Note: Number of items should not be said to the subjects. If any parts of the instructions are not understood, they can be repeated.

INSTRUCTIONS

"Write your name, surname, grade and the date on the top of your paper.

Now let us play another game together. I shall tell you to do one thing at a time. Listen carefully and do it quickly right after my dictation; not while I am speaking, otherwise you may not get all I say. Understood?

1. Draw a line on your paper wherever and as long as you like.

Finished? Very good.

2. Draw another line wherever and as big or as small as you like.

3. Draw a circle, wherever and as big or as small as you like.

4. Draw a triangle wherever you like.

5. Put seven spots on your paper anywhere you want.

6. Draw a cross anywhere you like.

7. Draw five lines, arrange them however you like.

8. Draw a quadrilateral anywhere you like.

9. Write your name wherever you like.

As soon as this is finished, collect the sheets. Don't give too much time, but press the children to make quickly.

When all the sheets are collected, give new sheets and say:

Write your name and surname on the top of your paper. Have you finished? Then try to draw again exactly the same as you did before but I shall not tell you anything. You must recall your first drawing sharply,

what, where and how you have done. Try your best, please."

Time for this second experiment: 5 minutes.

Note: Number of items should not be said to the subjects. If any parts parts of the instructions are not understood, they can be repeated.



Classification of Subjects into 10 Age Groups

Age	A1a	A1b	D1b	B2	C2a	B3	C3a	A4a	L4	Total Subjects
4/9 - 5/8	2	2	-	-	-	-	-	-	-	4
5/9 - 6/8	4	1	18	-	-	-	-	-	-	23
6/9 - 7/8	13	9	12	17	9	-	1	-	-	61
7/9 - 8/8	17	16	-	9	20	24	16	-	-	102
8/9 - 9/8	5	5	-	7	3	5	21	1	16	63
9/9 - 10/8	1	1	-	2	-	3	2	5	7	21
10/9 - 11/8	-	-	-	-	-	-	-	14	-	14
11/9 - 12/8	-	-	-	-	-	-	-	15	-	15
12/9 - 13/8	-	-	-	-	-	-	1	6	-	7
13/9 - 14/8	-	-	-	-	-	-	-	3	-	3
N	42	34	30	35	32	32	41	44	23	313
A.M.	7/10	7/11	6/8	8	8	8/5	8/11	11/11	9/7	

(The arithmetic mean or A.M. has been rounded to the next whole number of the month)

APPENDIX III

Number of R, W, I and M.

III.1 First Sheets of the Nine Classes

School and Grade	R	W	I	M	Total of Signs
A1a	330	24	6	9	369
A1b	292	4	5	5	306
D1	263	4	2	1	270
B2	304	11	0	0	315
C2	283	4	1	0	288
B3	281	7	0	0	288
C3	356	7	2	4	369
A4	389	7	0	0	396
D4	207	0	0	0	207

III.2 First Sheets of the Four Grades

Grade	R	W	I	M	Total of Signs
I	885	32	13	15	945
II	587	15	1	0	603
III	637	14	2	4	657
IV	596	7	0	0	603

Number of R, W, I and M

III.3 Memory Sheets of the Nine Classes

School and Grade	R	W	I	M	Total of Signs
Ala	299	14	8	57	378
Alb	239	43	7	57	306
D1	226	2	3	39	270
B2	244	5	2	37	288
C2	238	5	3	42	288
B3	252	5	1	30	288
C3	323	1	5	40	369
A4	386	2	1	7	396
D4	195	0	2	10	207

III.4 Memory Sheets of the Four Grades

Grade	R	W	I	M	Total of Signs
I	764	19	18	153	954
II	482	10	5	79	576
III	575	6	6	70	657
IV	581	2	3	17	603

Note: 3 memory sheets of B₂ were lost during the transportation, so subjects of B₂ becomes 32 in place of 35.

APPENDIX IV

Number of Subjects Corresponding With Number of M
in the Memory Sheets

IV.1. The Nine Experimental Classes.

School and Grade	No. of M					
	0	1	2	3	4	5
A1a	10	17	9	3	2	1
A1b	4	11	12	6	1	
D1	6	12	9	3		
B2	7	15	8	2		
C2	7	14	6	4	1	
B3	14	9	6	3		
C3	12	23	3	2		1
A4	39	3	2			
D4	15	6	2			

IV.2 The Four Grades

Grade	No. of M					
	0	1	2	3	4	5
I	20	40	30	12	3	1
II	14	29	14	6	1	
III	26	32	9	5		1
IV	54	9	4			

IV.3 The Six Age Groups

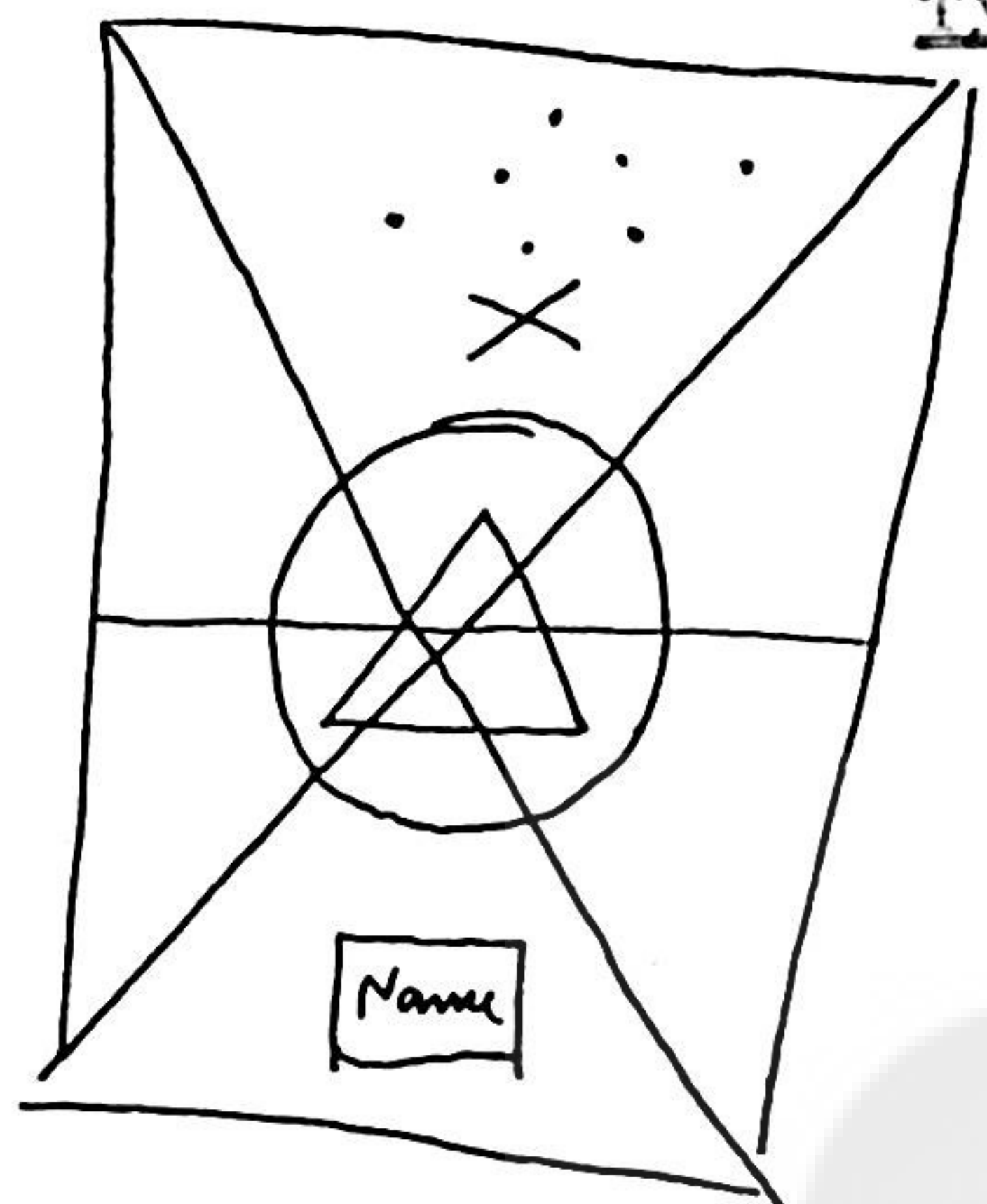
Age	No. of M					
	0	1	2	3	4	5
4/9 - 6/8	5	10	8	3		1
6/9 - 7/8	12	20	17	7	2	
7/9 - 8/8	27	40	21	11	2	1
8/9 - 9/8	25	30	6	2		
9/9 - 11/8	23	10	2			
11/9 - 14/8	22		3			

APPENDIX V

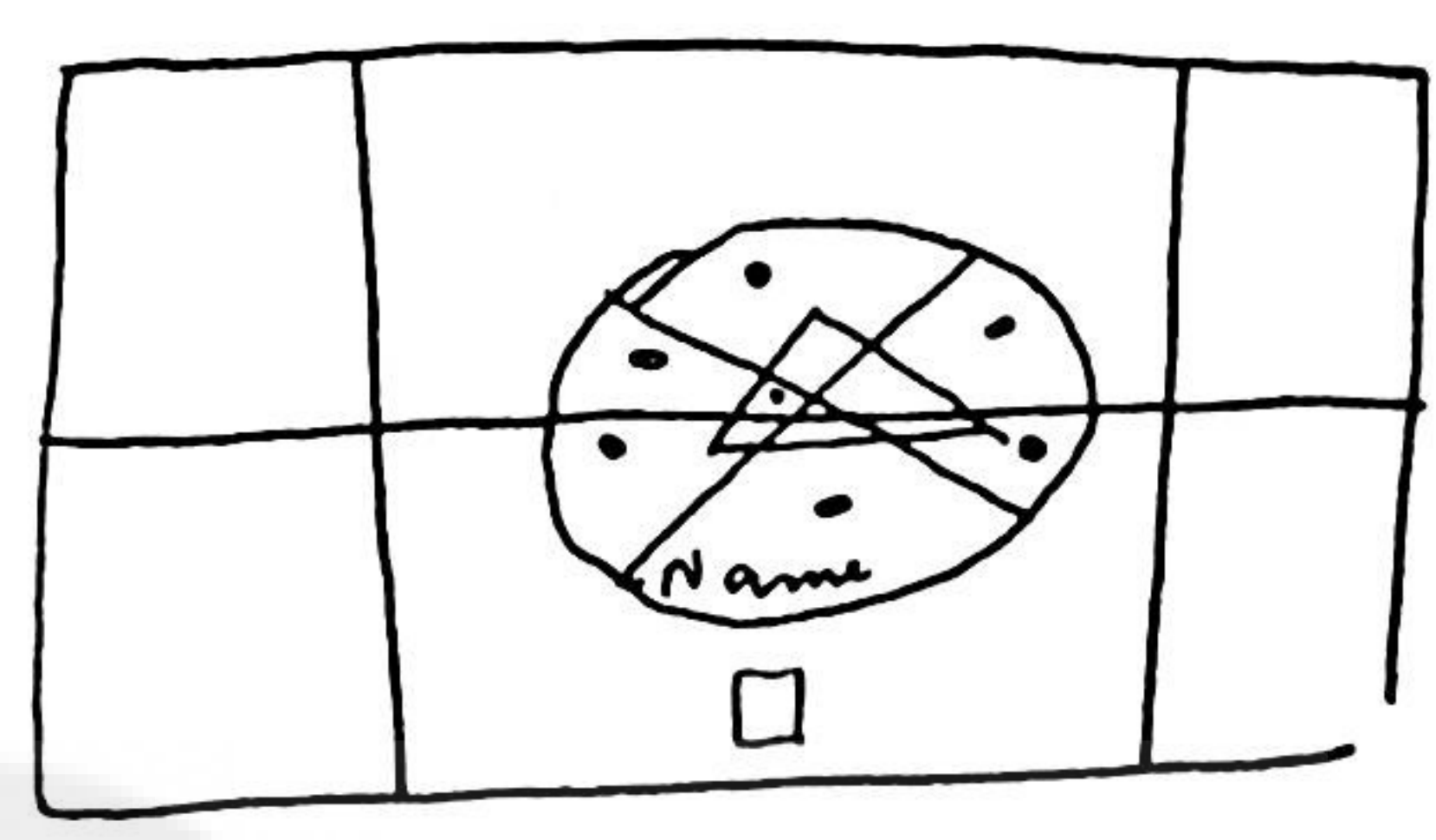
Examples of Types of Grouping Signs

According to the Classification Explained in Pages 29-30.

Type I A



IA.1 Subject No. 24 C3

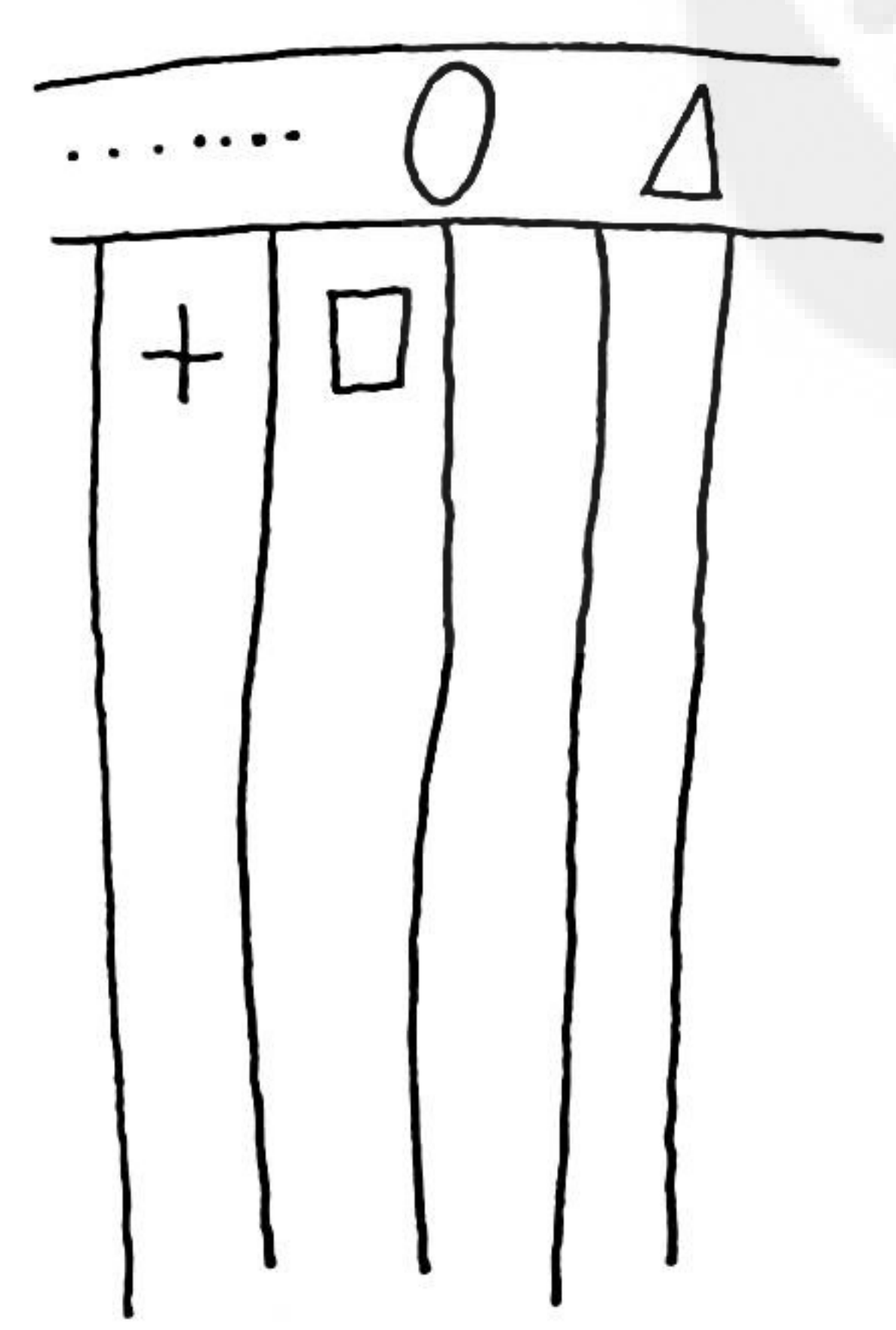


IA.2 Subject No. 34 A4

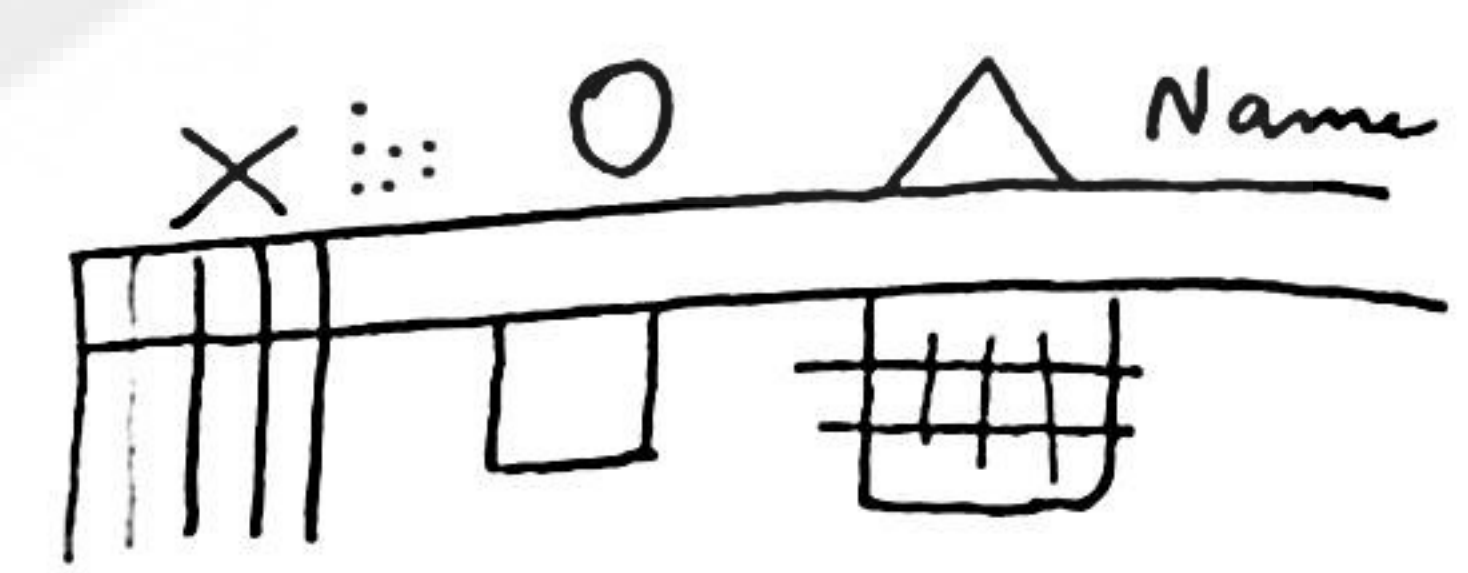
Type I B

No example of this type in the data so far obtained.

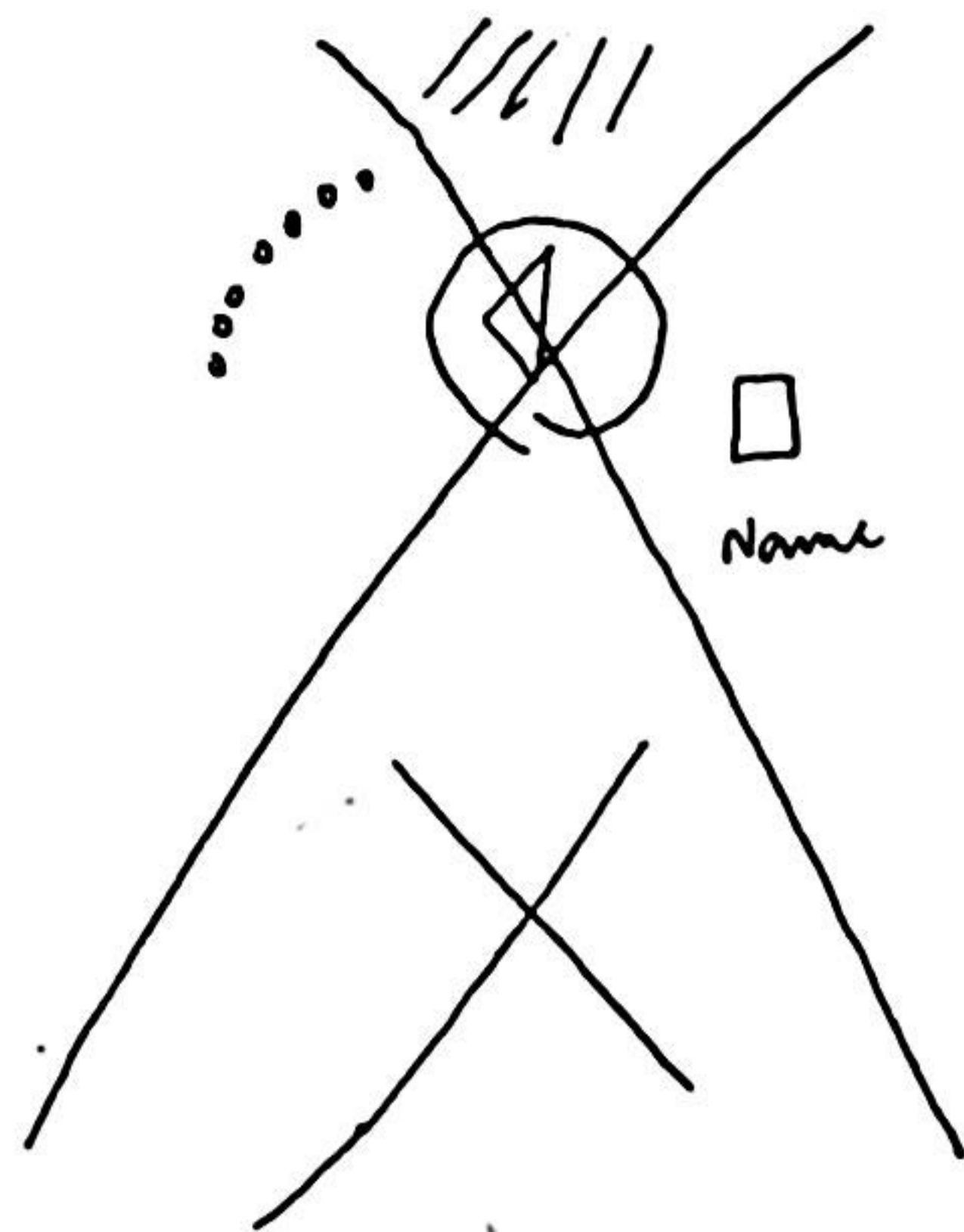
Type I C



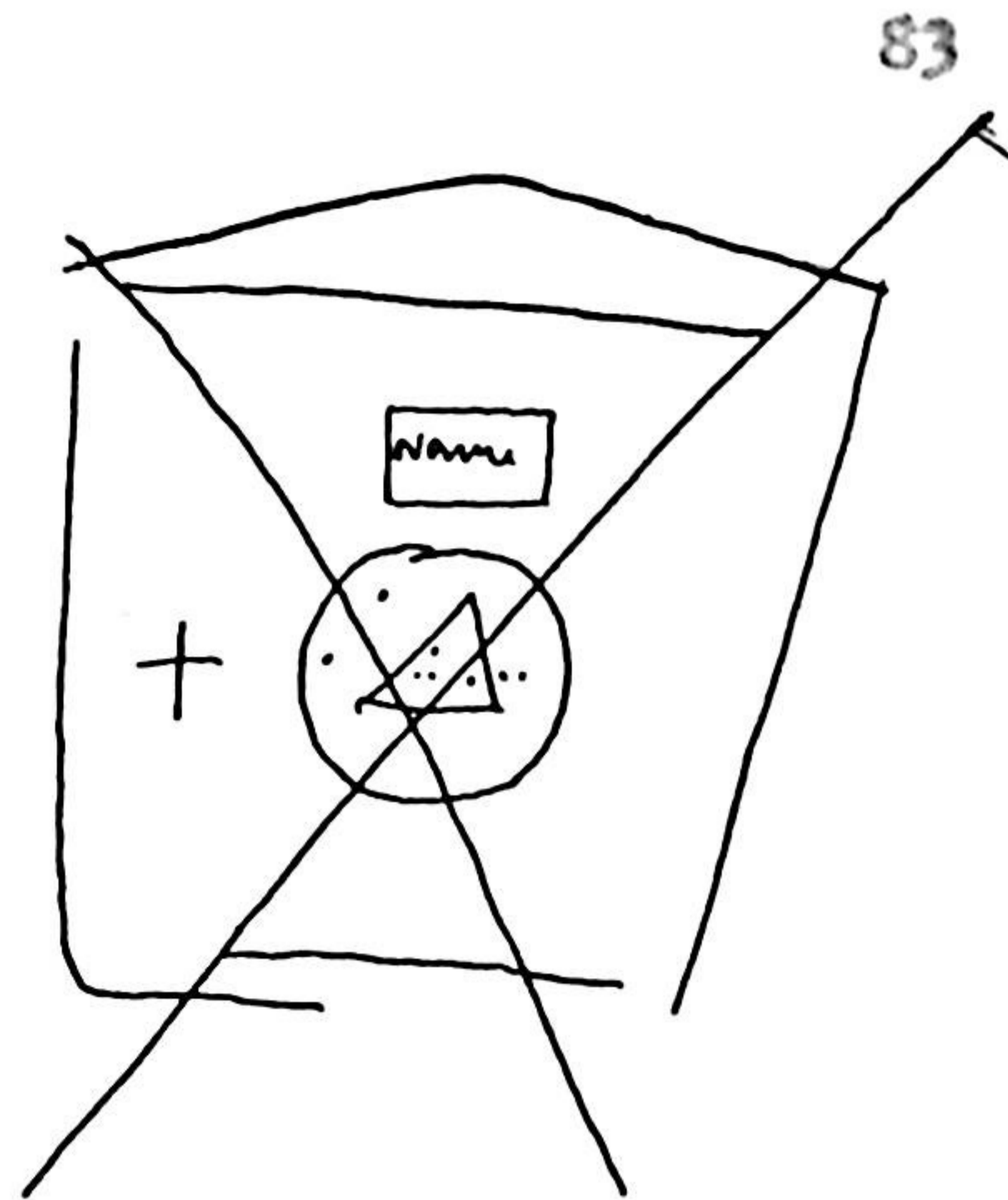
IC.1 Subject No. 4 D1



IC. 2 Subject No. 20 C2



IC.3 Subject No. 41 C₃

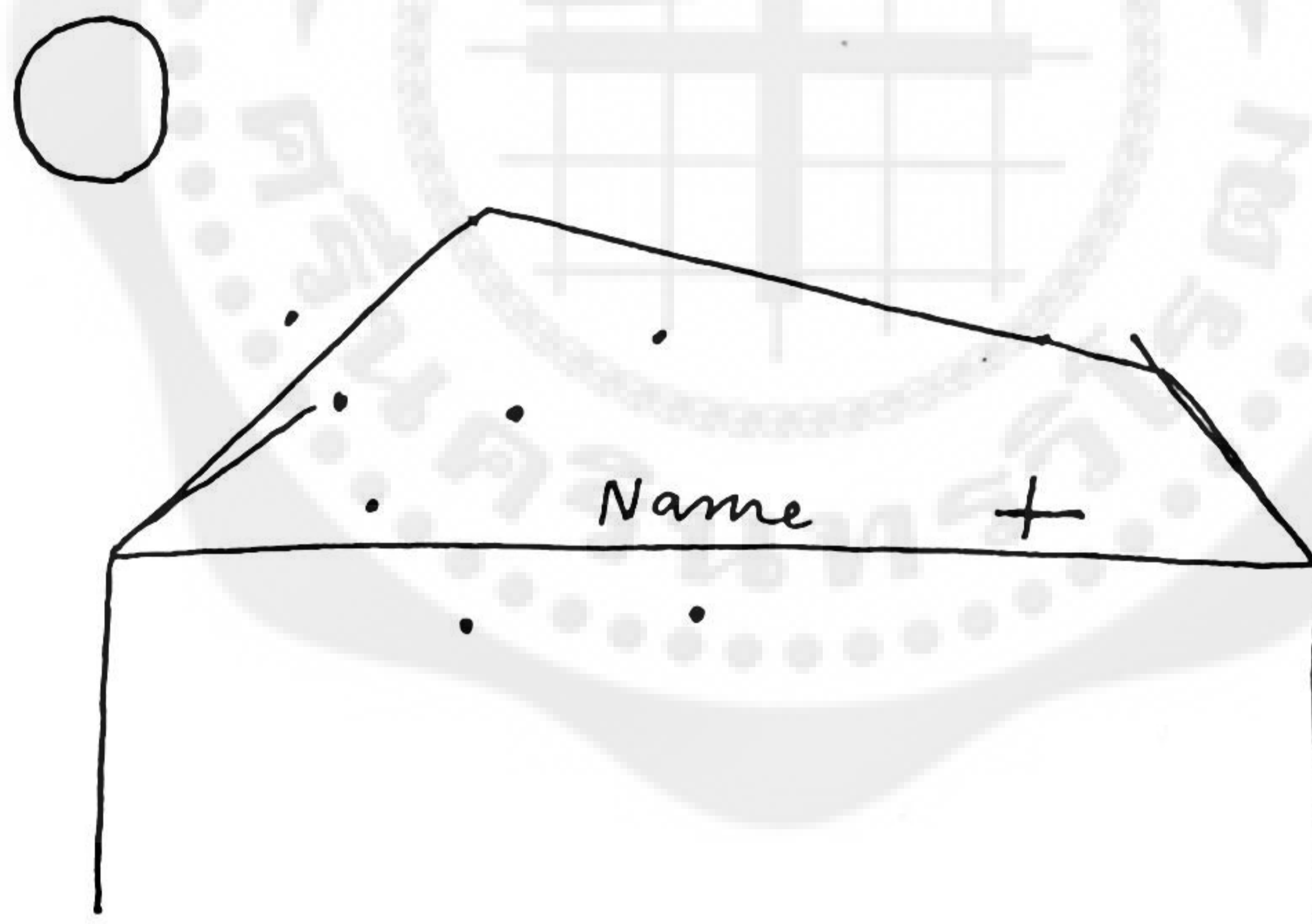


IC.4 Subject No. 9 D₄

Type II A

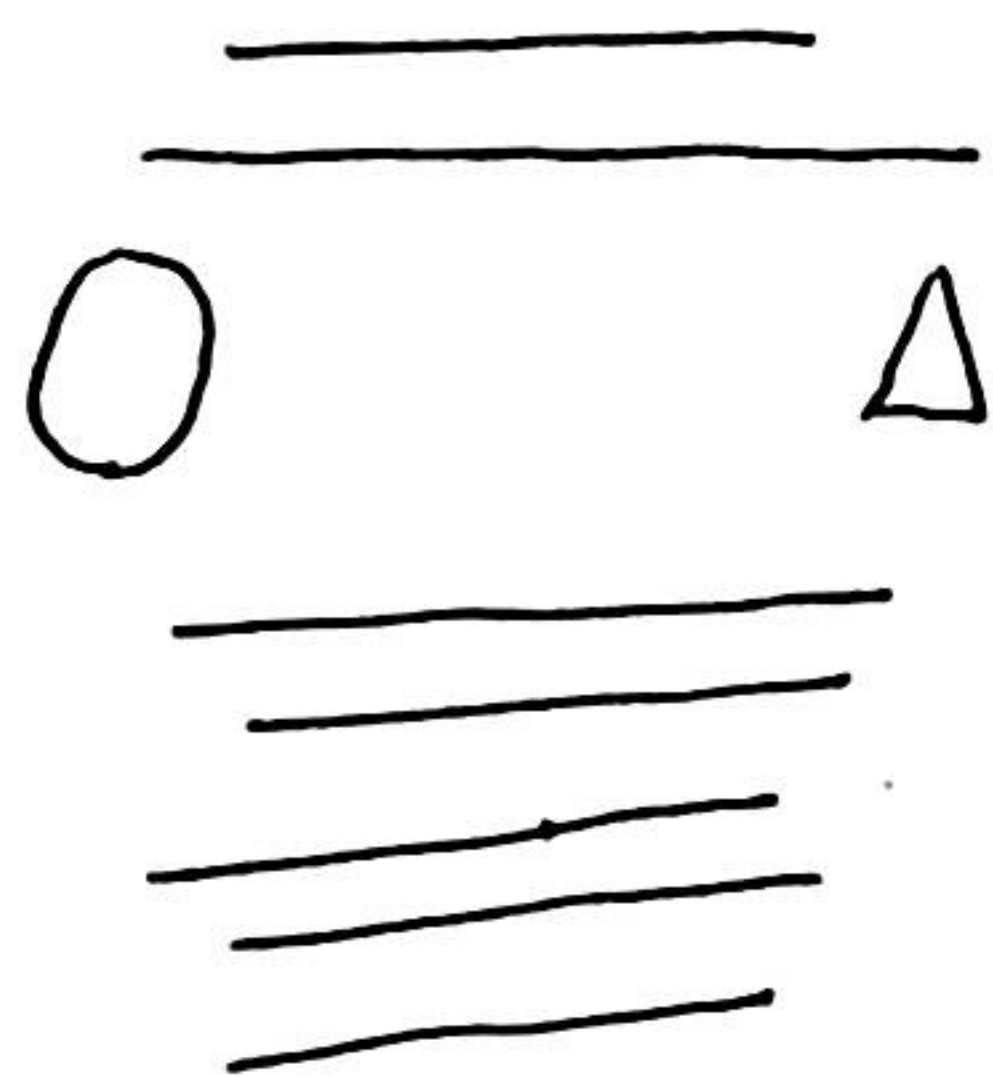
No example of this type in the data so far obtained.

Type II B

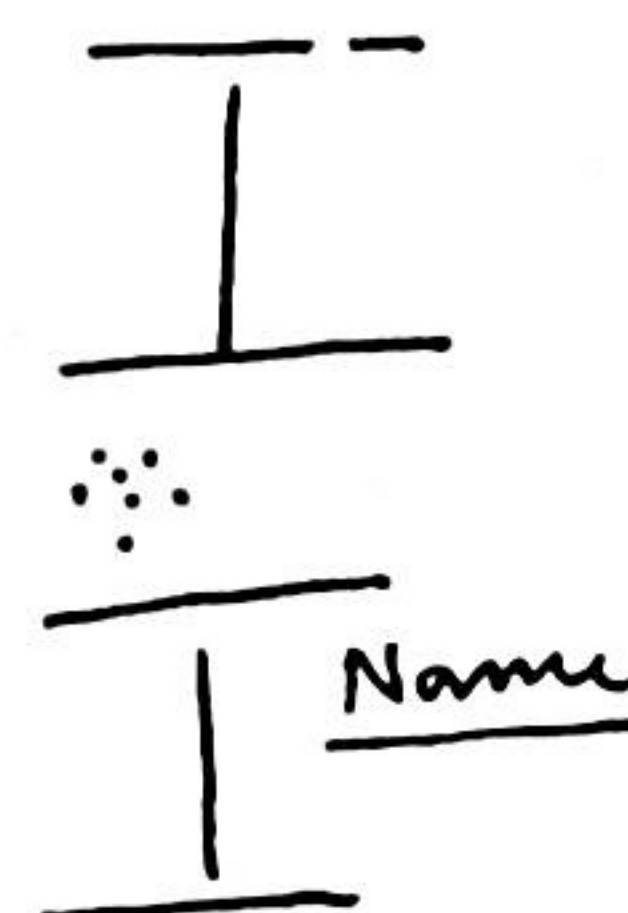


II B.1 Subject No. 17 A₄

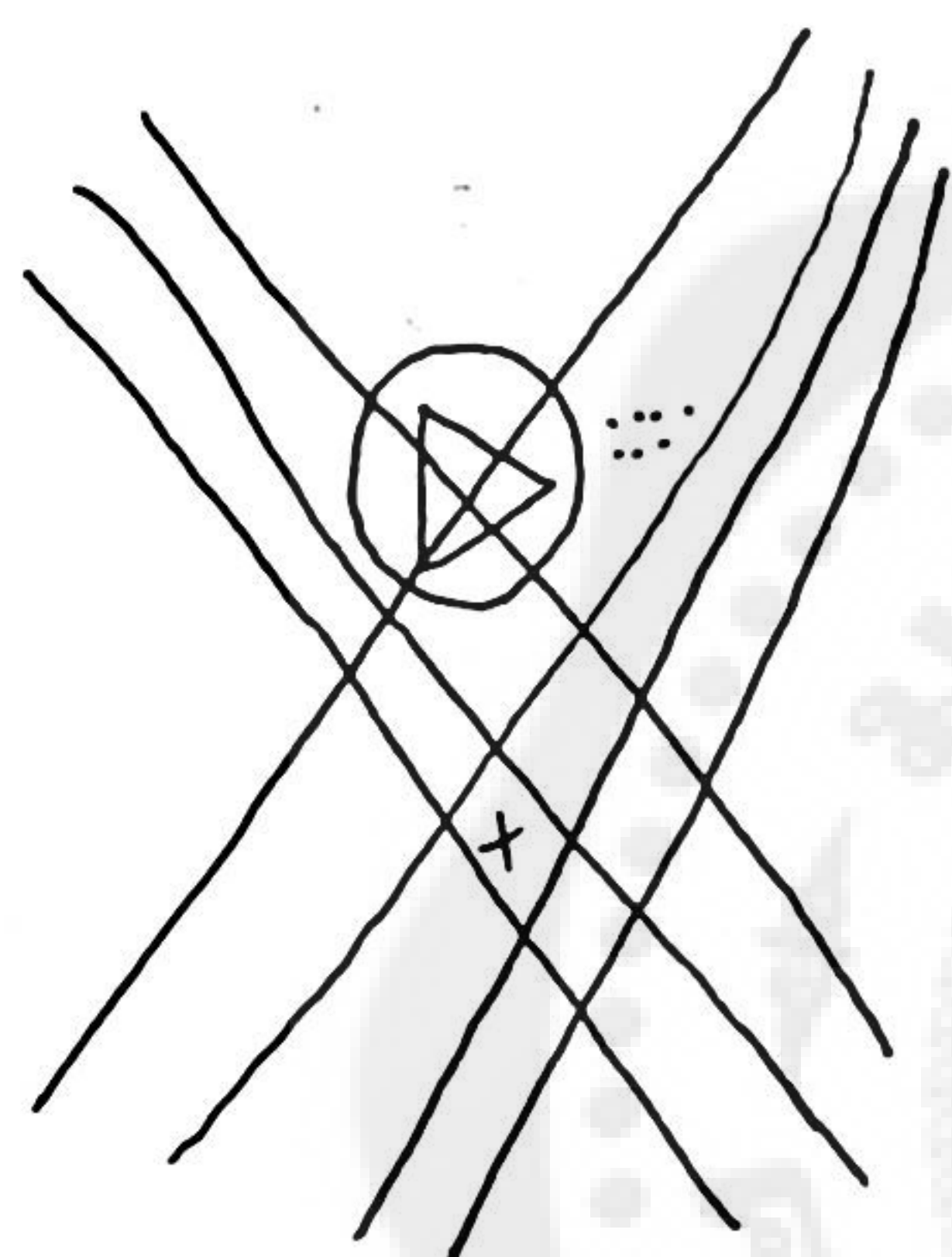
Type II C



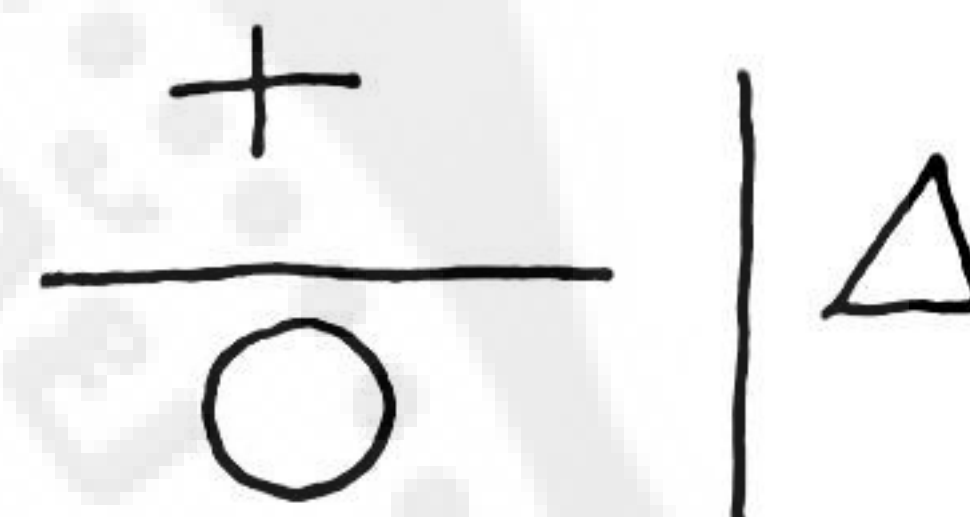
II C.1 Subject No. 13 Alb.



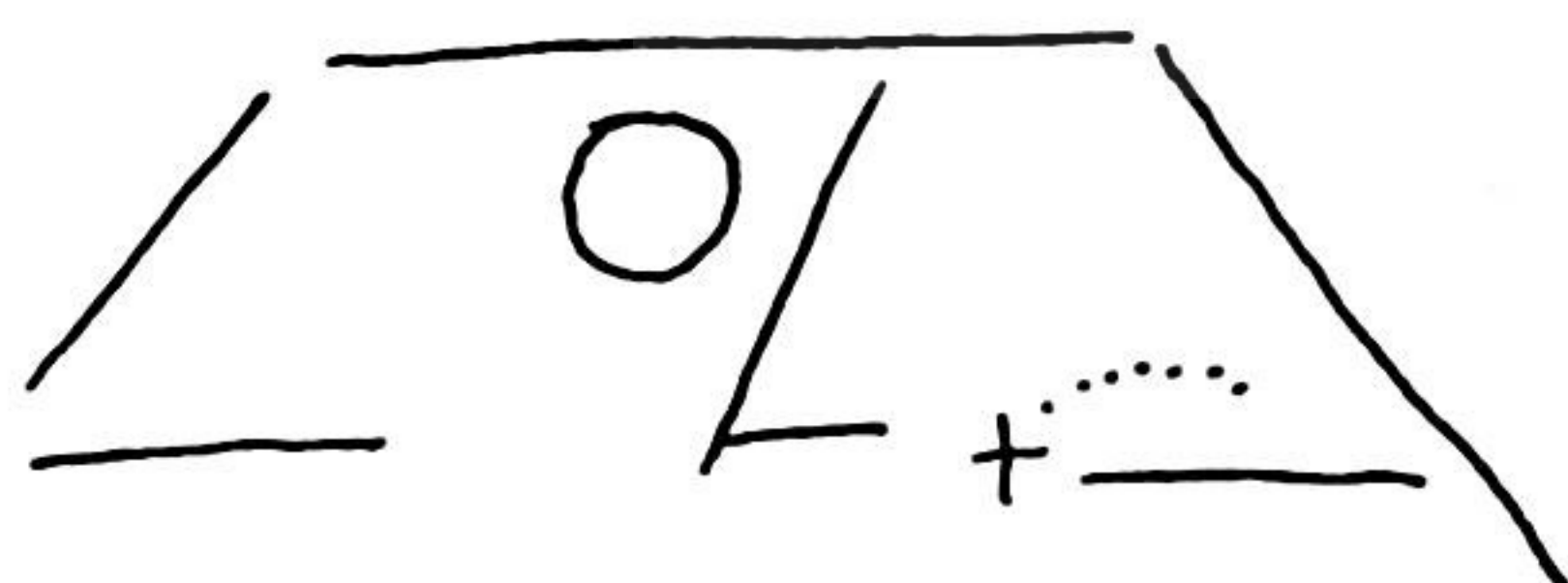
II C.2 Subject No. 36 B₂



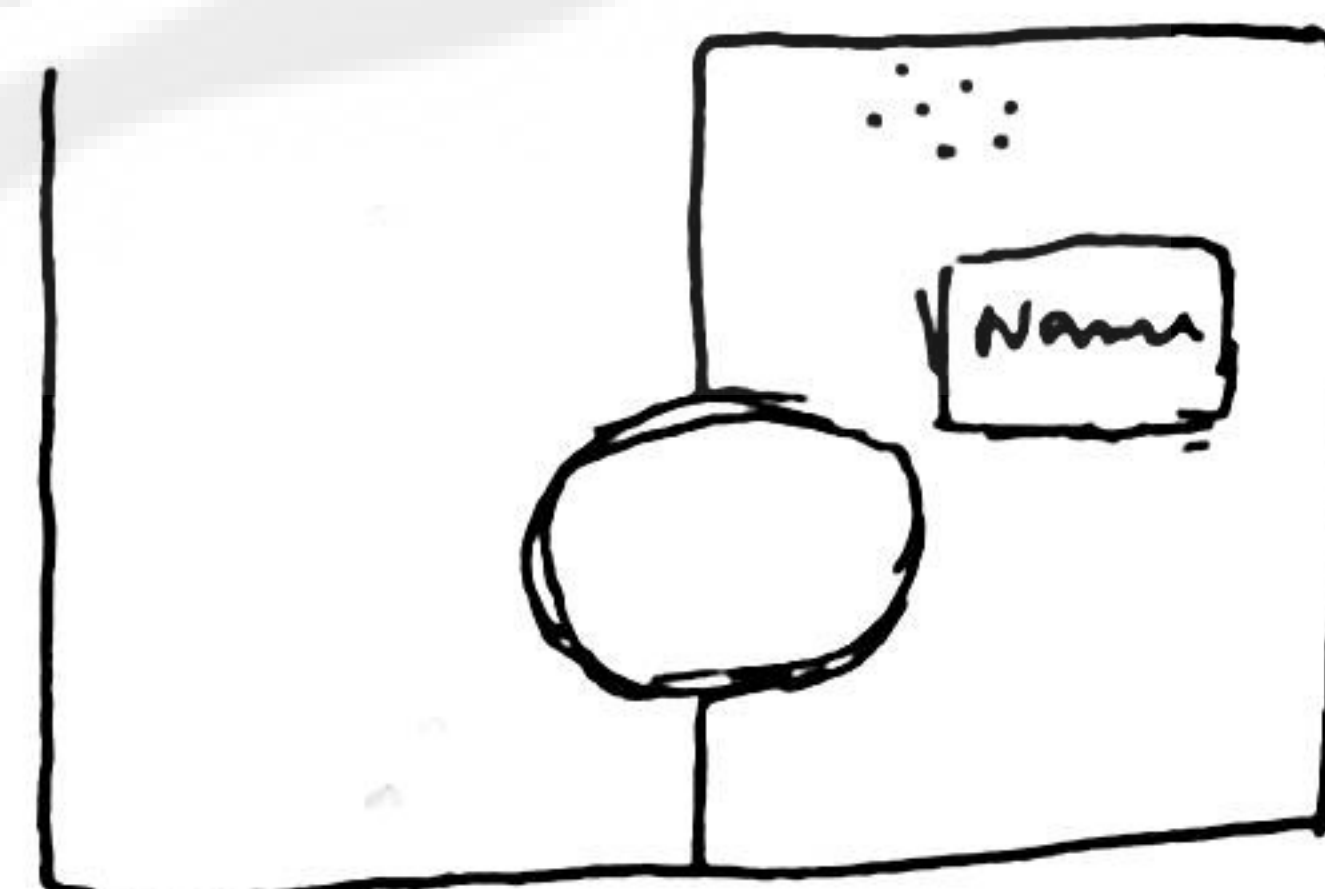
II C.3 Subject No. 19 C₃



II C.4 Subject No. 24 D₄

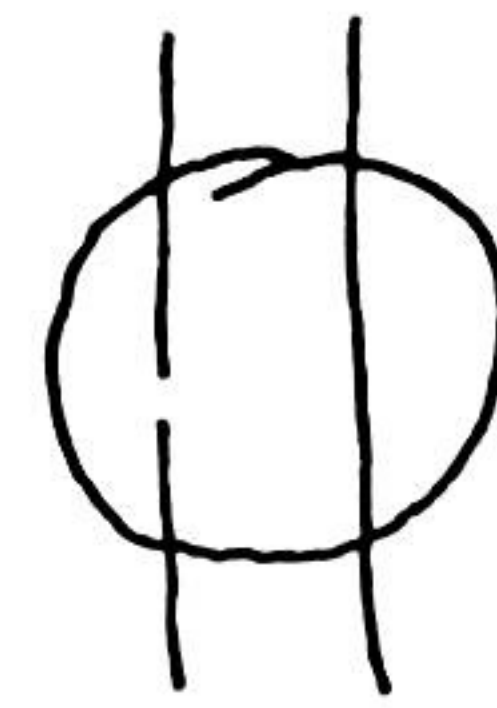
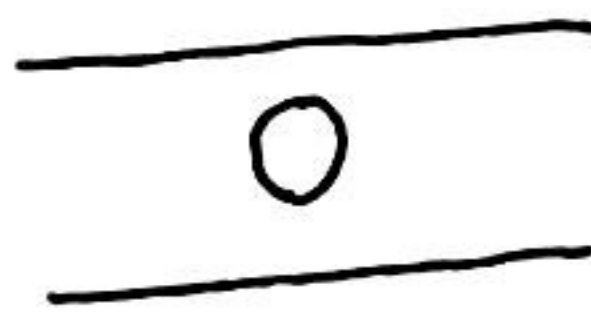


II C.5 Subject No. 46 A₄

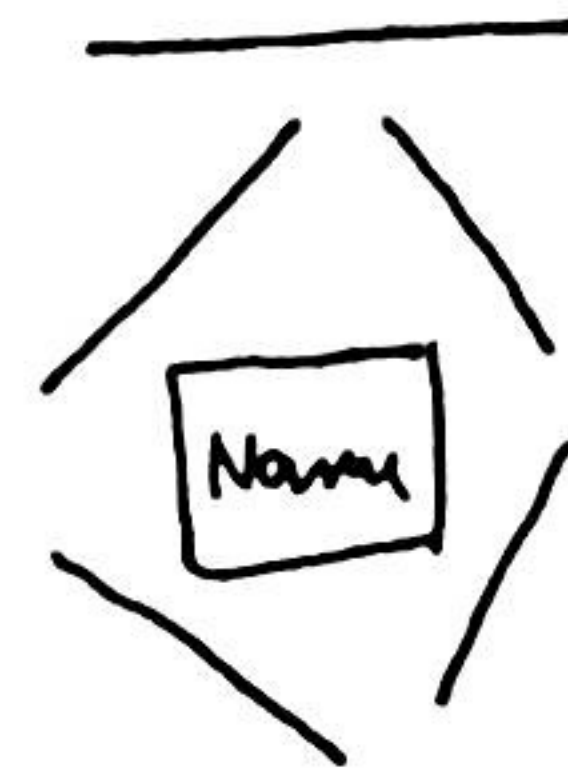
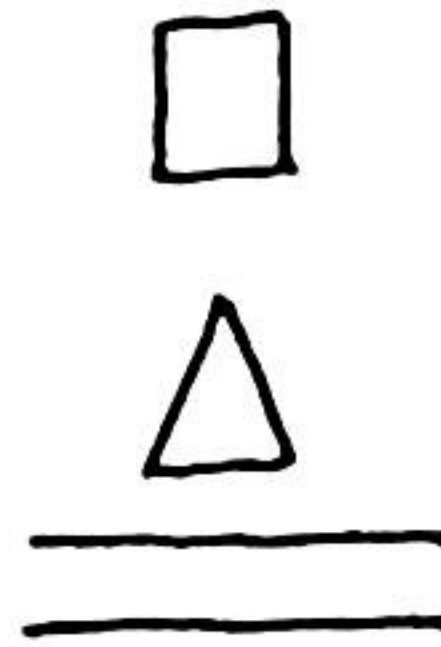
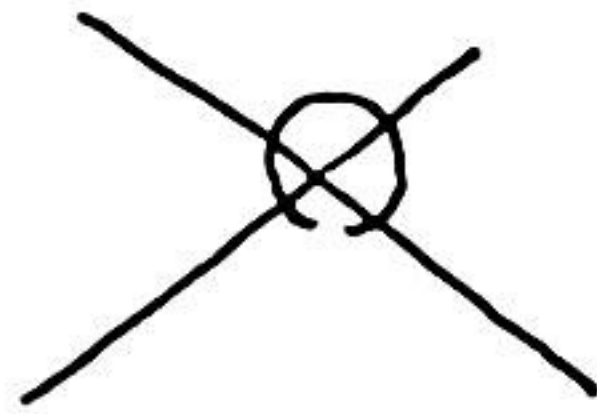


II C.6 Subject No. 39 A₄

Type III A



III A.1 Subject No. 16 D₁ IIIA.2 Subject No. 19 D₁ IIIA.3 Subject No. 36 C₃



IIIA.4 Subject No. 5 C₃ IIIA.5 Subject No. 17 C₃ IIIA.6 Subject No. 10 D₄



IIIA.7 Subject No. 12 A₄

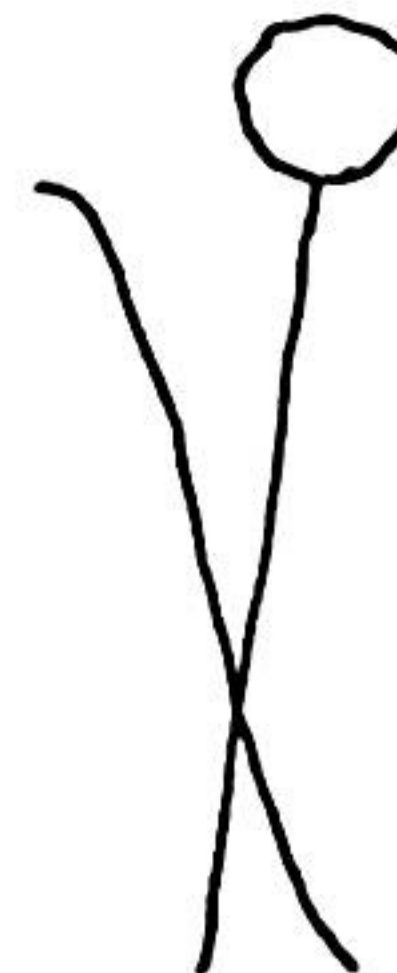
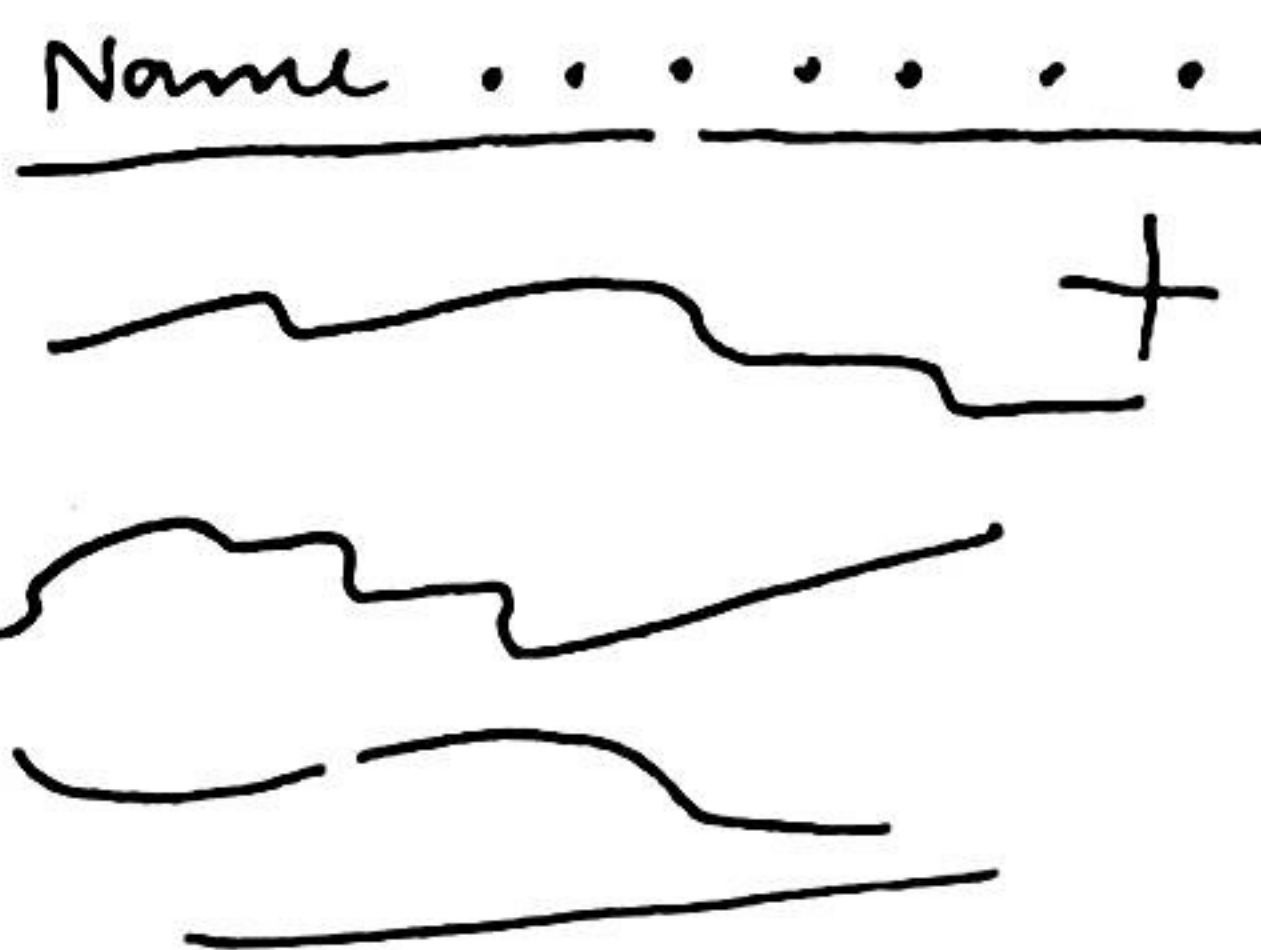
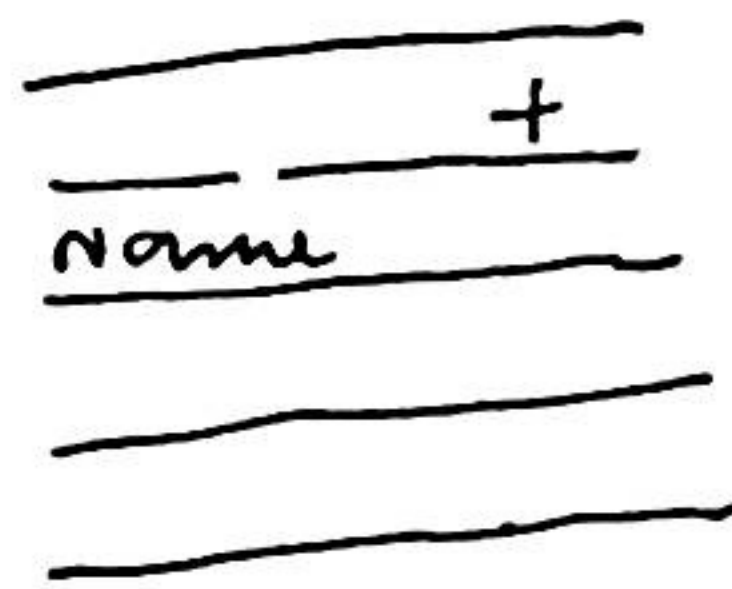
IIIA.8 Subject No. 16 A₄

Type III B

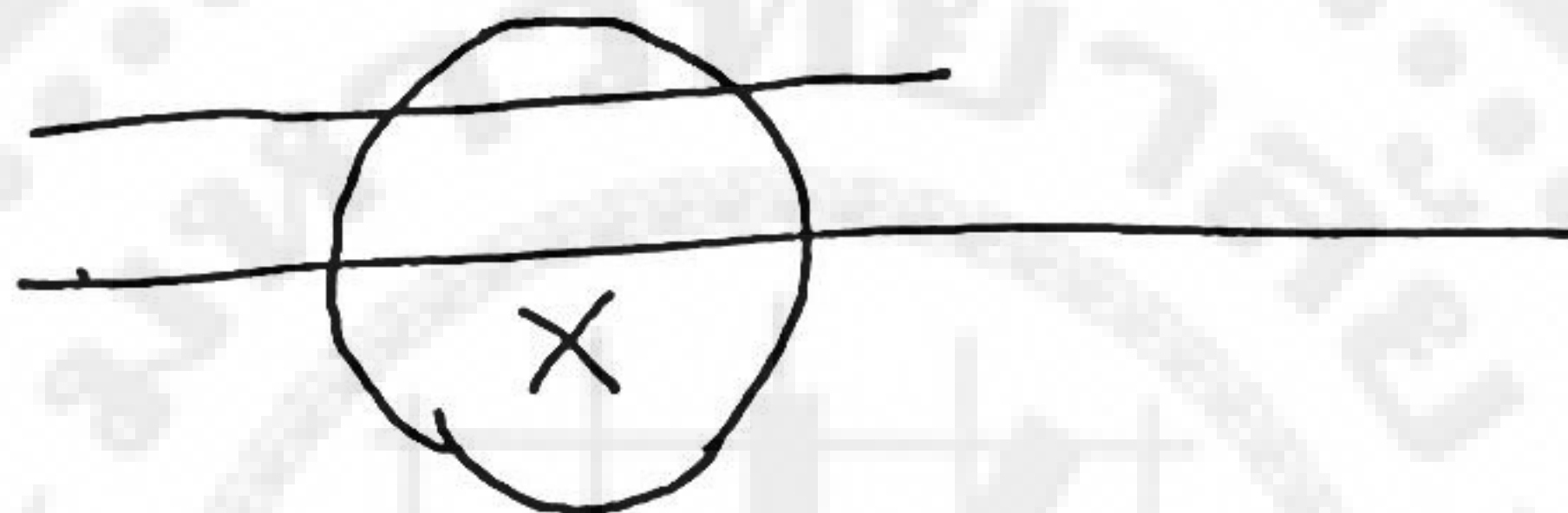
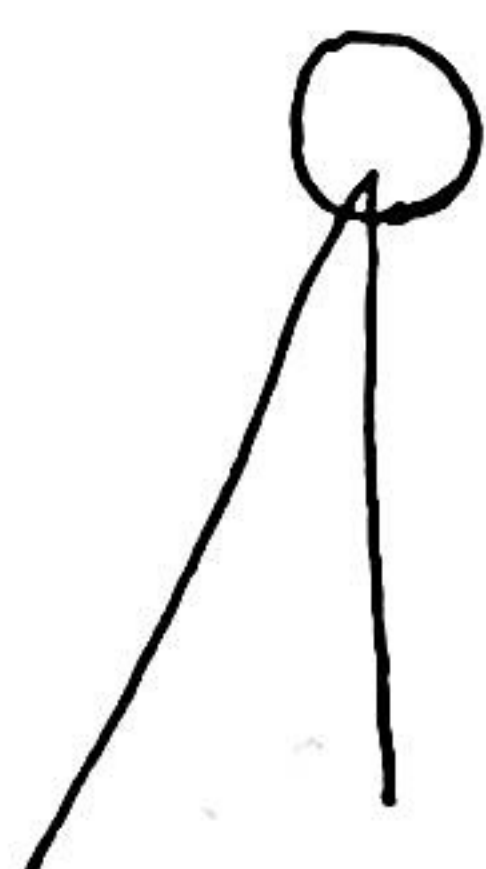


III B.1 Subject No. 40 A₄

Type III C



III C.1 Subject No. 26 D₁ III C.2 Subject No. 2 C₂ III C.3 Subject No. 27 C₂



III C.4 Subject No. 1 B₃ III C.5 Subject No. 24 A₄ III C.6 Subject No. 29 B₃

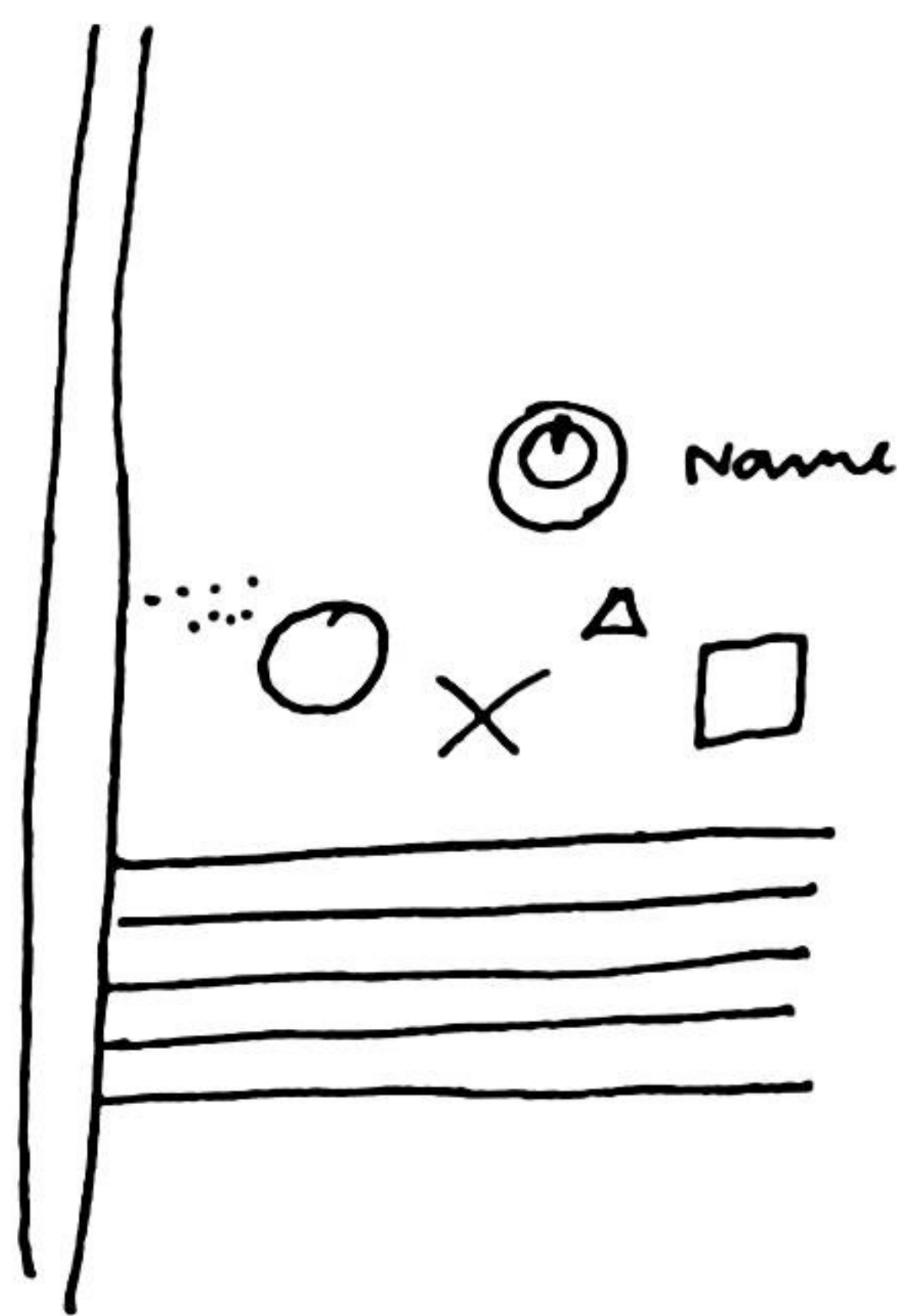


III C.7 Subject No. 6 A_{1b}

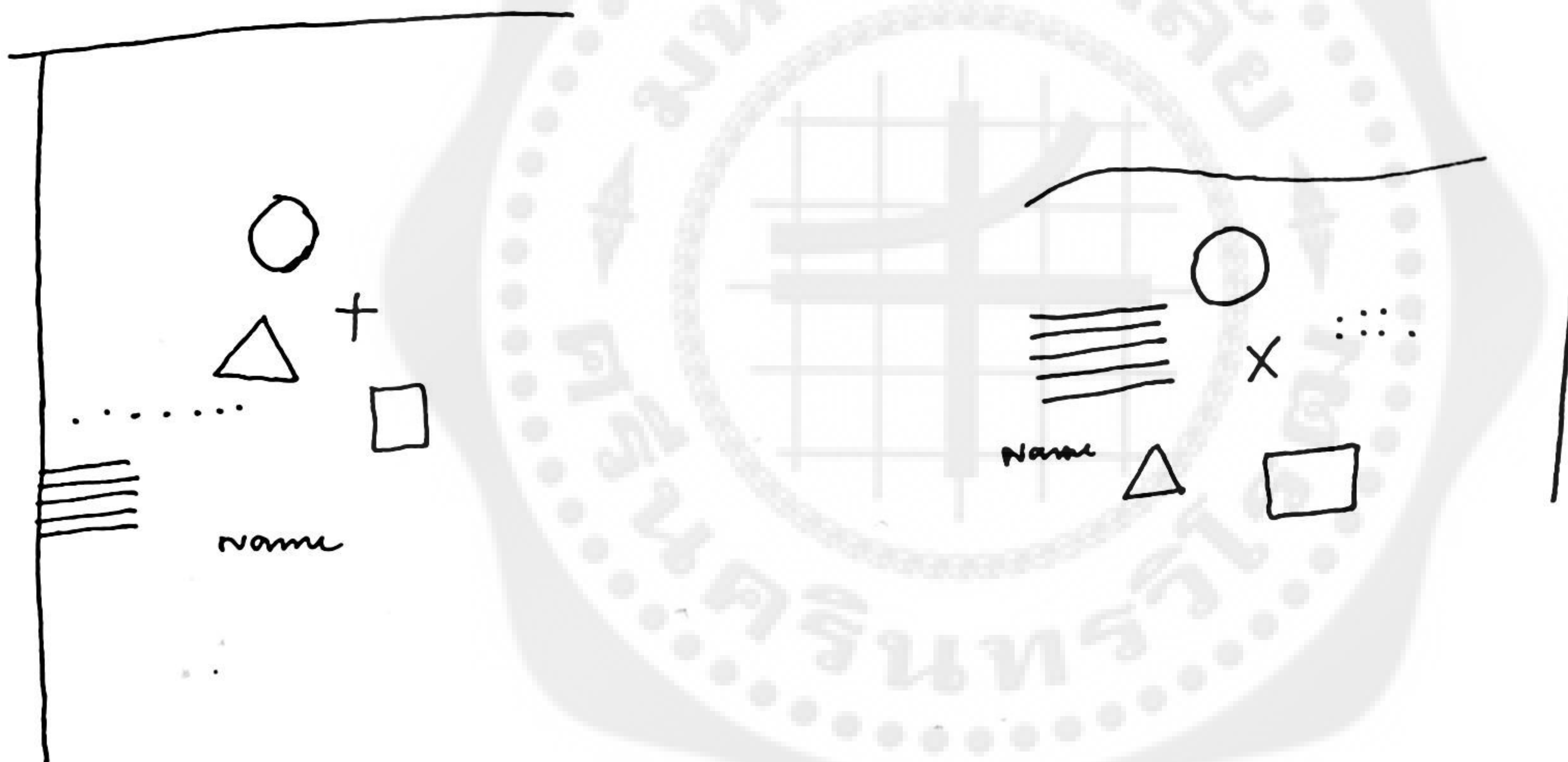
Type IV A



IV A.1 Subject No. 6 D₁



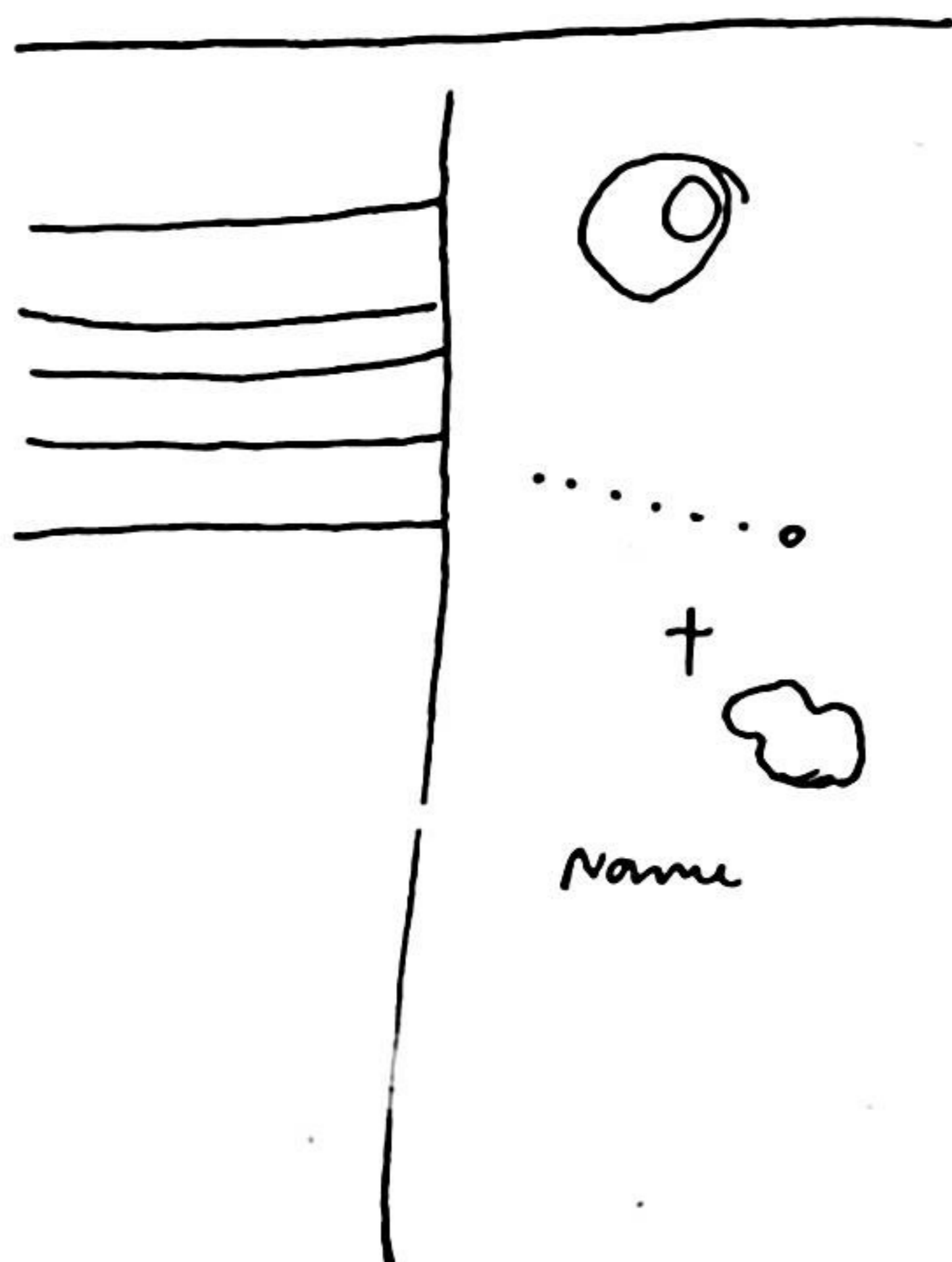
IV A.2 Subject No. 3 A_{1a}



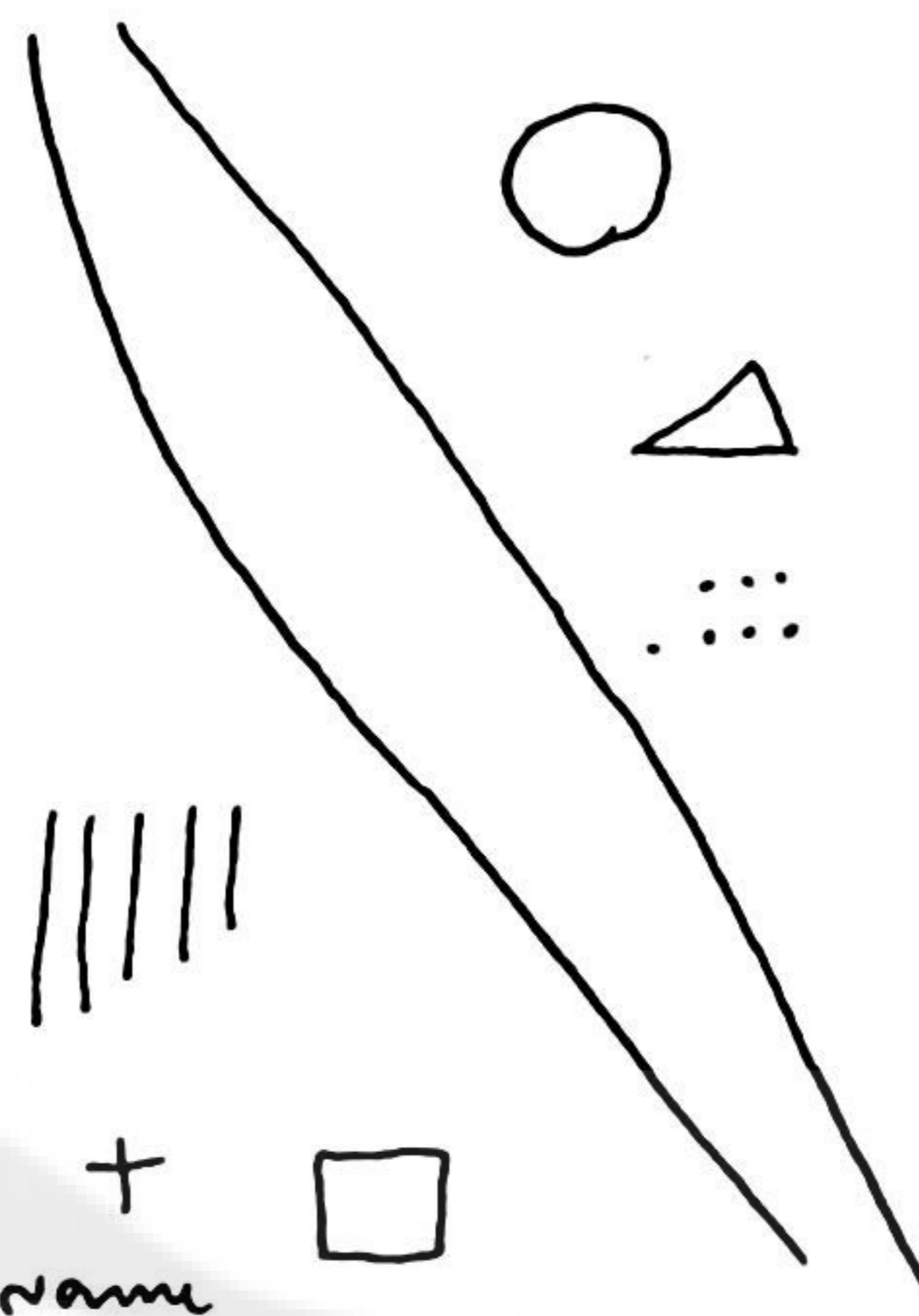
IV A.3 Subject No. 3 D₁

IV A.4 Subject No. 1 A₄

Type IV B

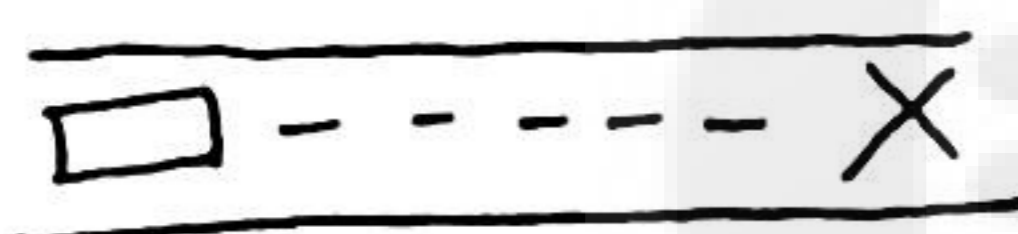


IV B.1 Subject No. 7 G₃

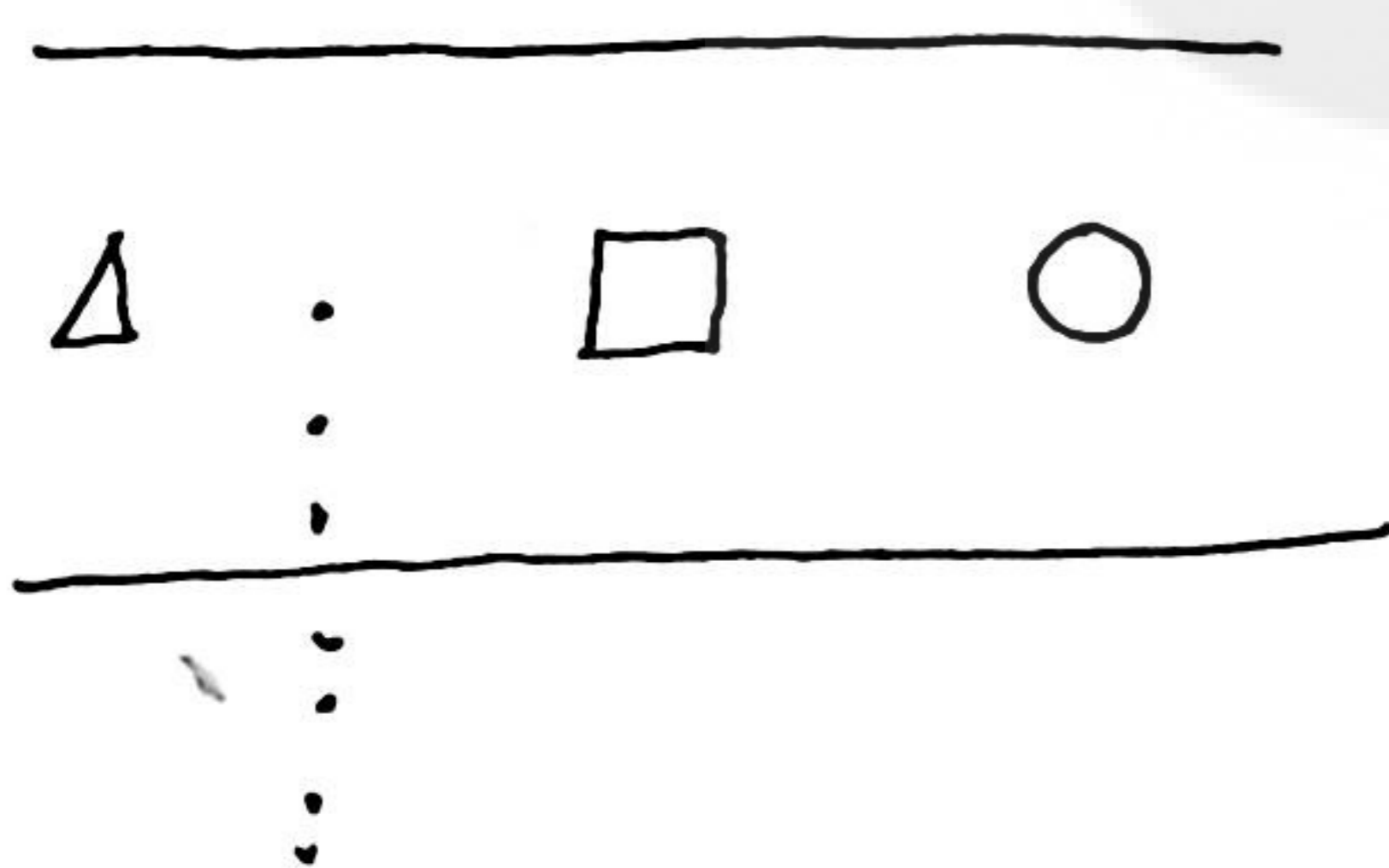


IV B.2 Subject No. 17 G₃

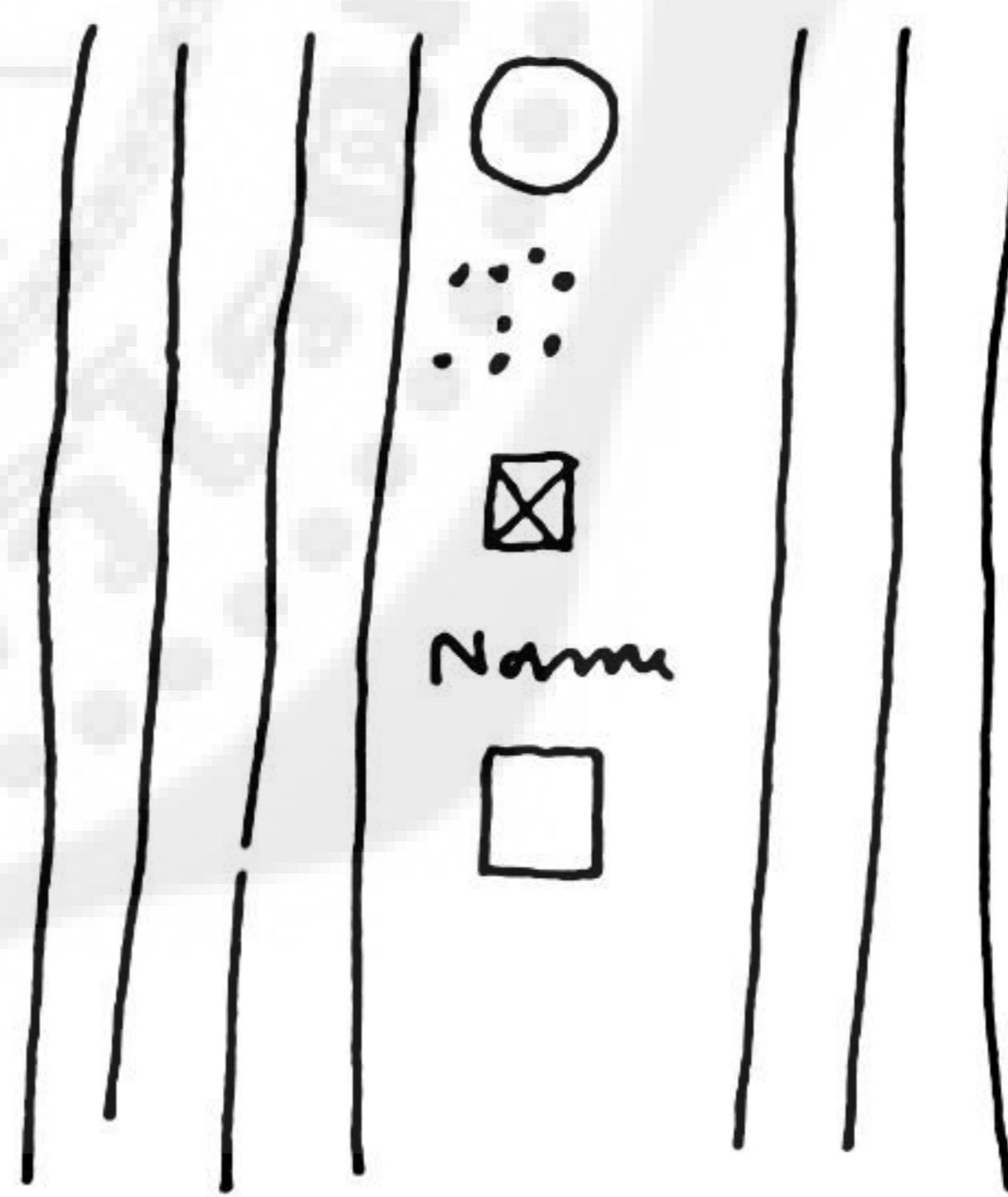
Type IV C



IV C.1 Subject No. 18 D₁

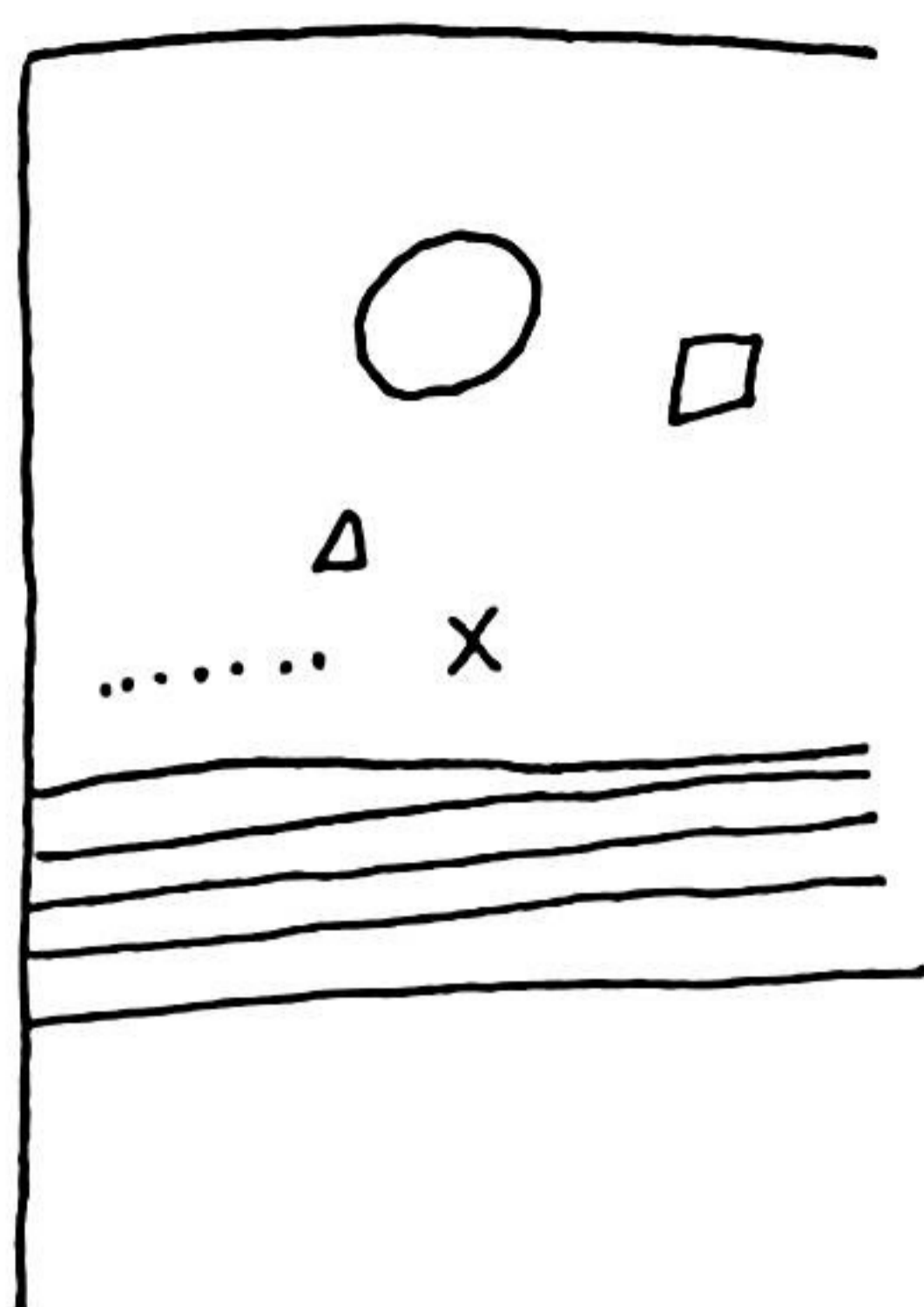


IV C.3 Subject No. 22 B₃

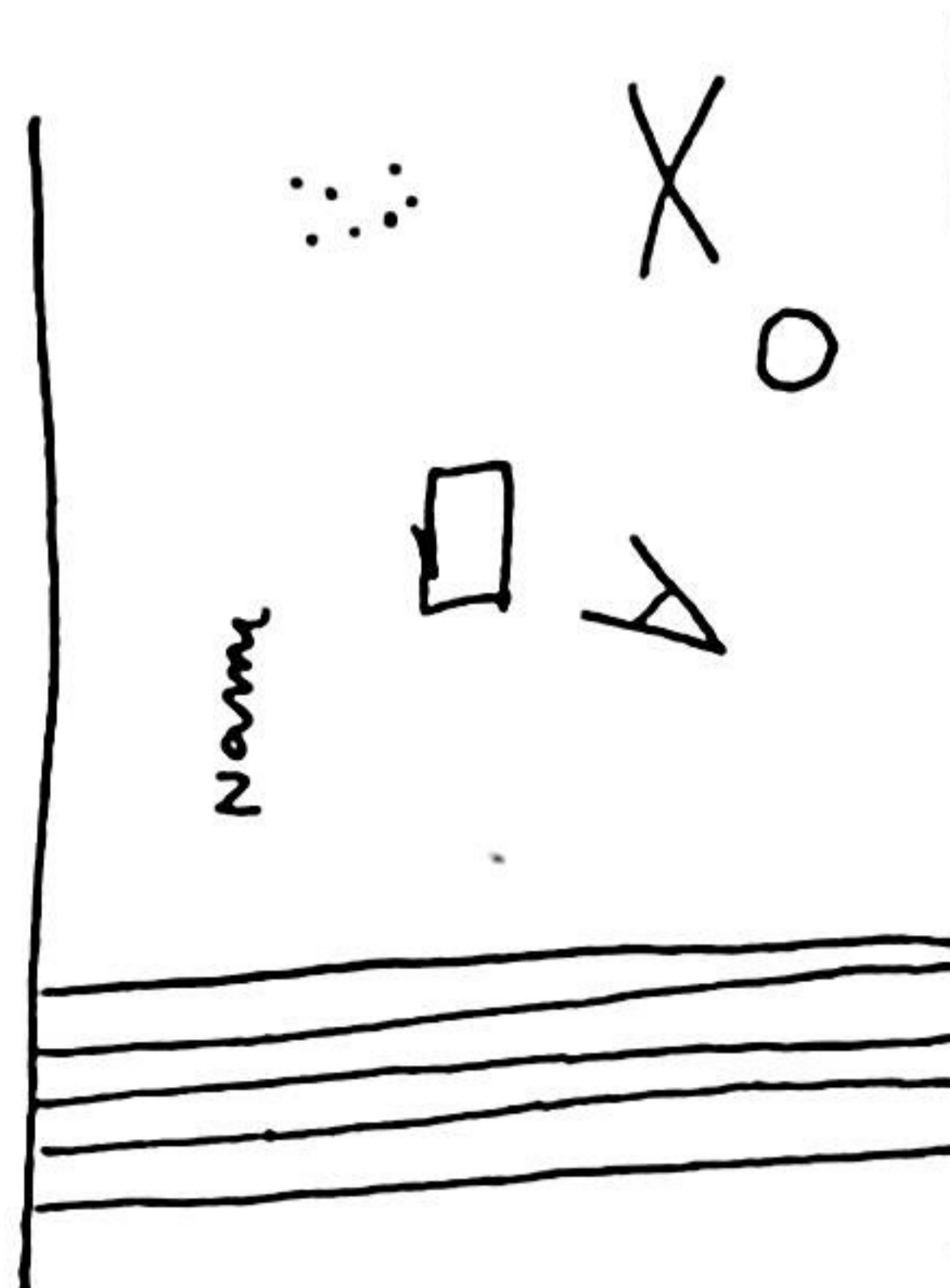


IV C.2 Subject No. 9 B₂

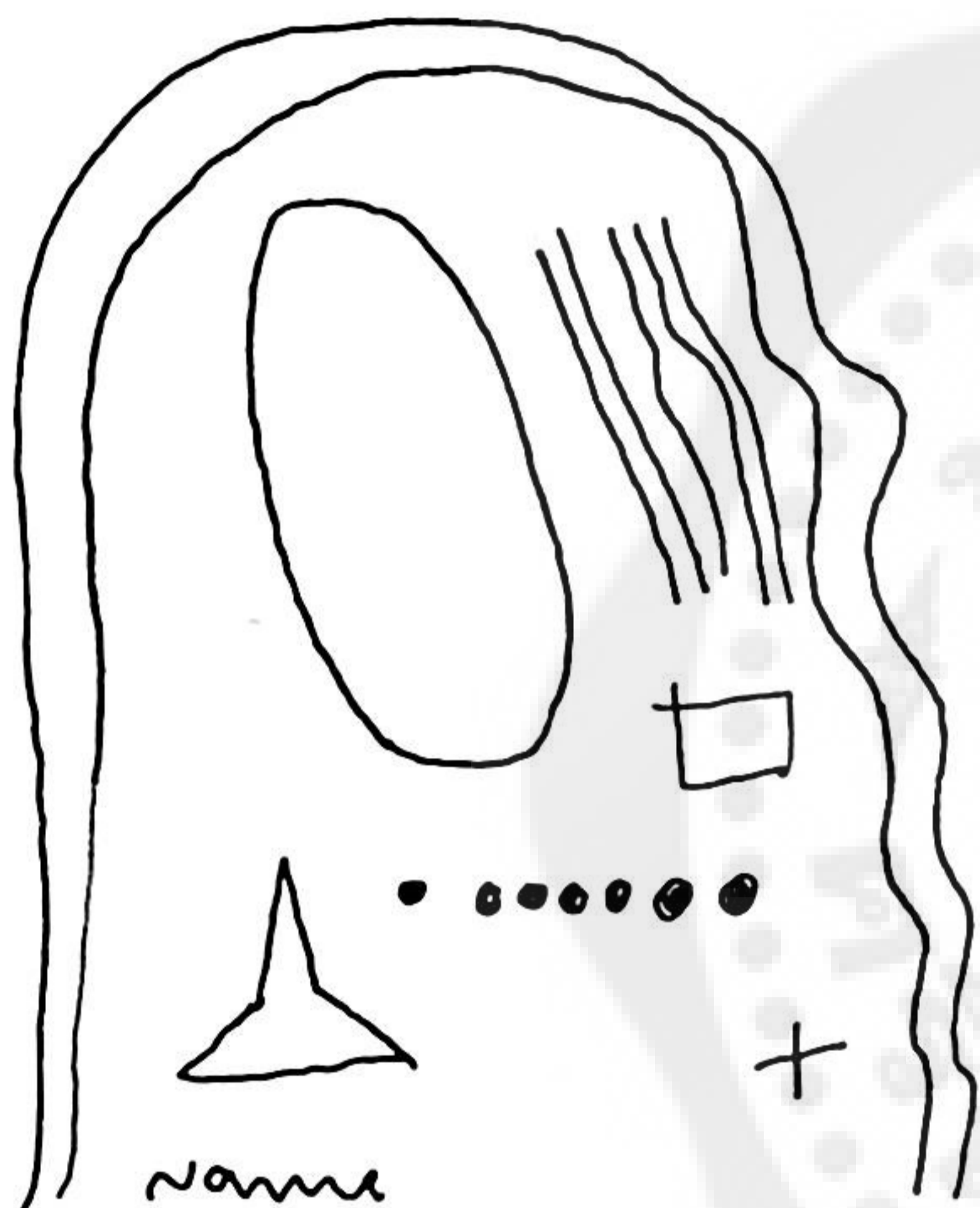
Type IV D



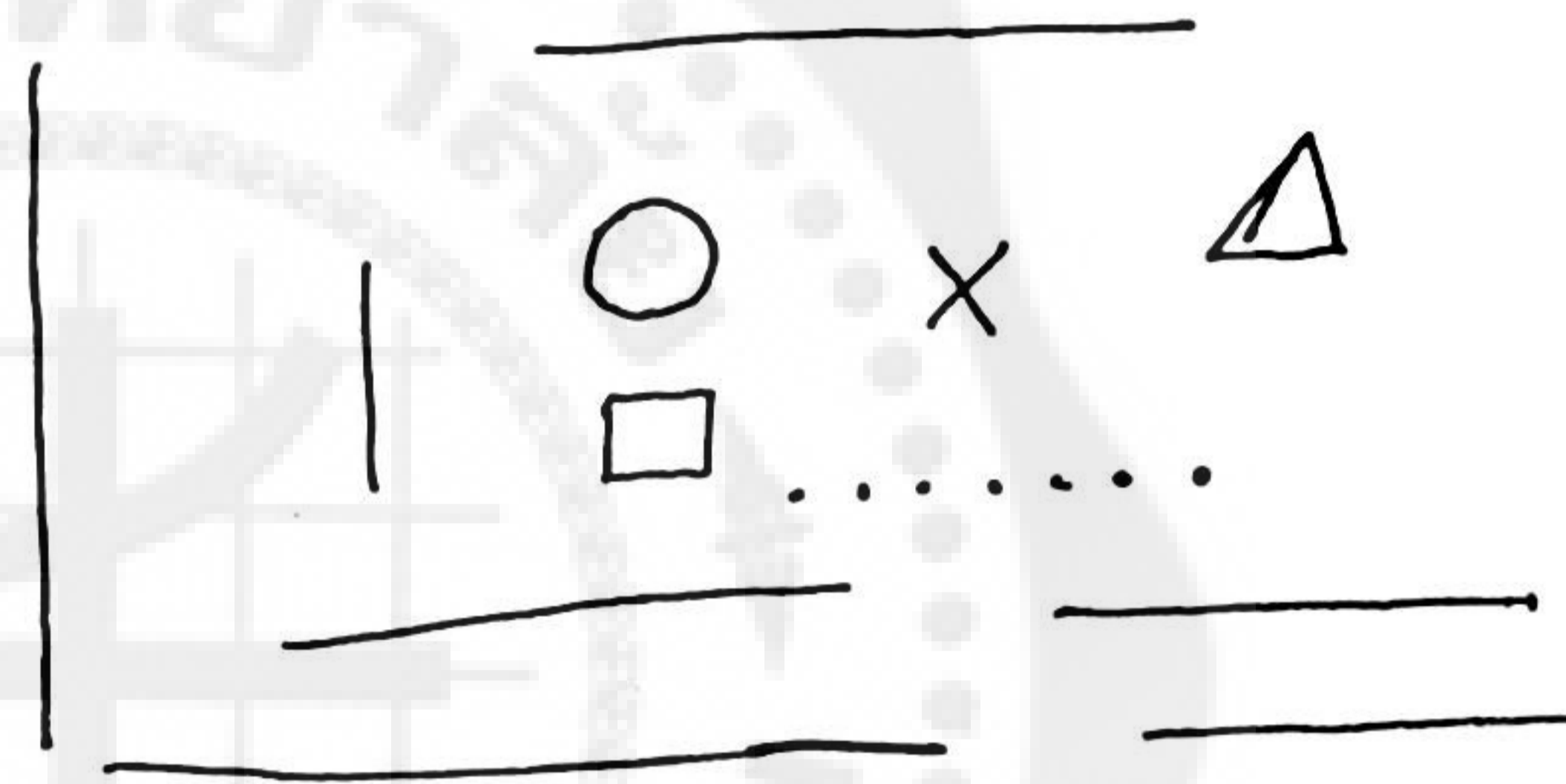
IV D.1 Subject No. 6 A1a



IV D.2 Subject No. 30 A1a

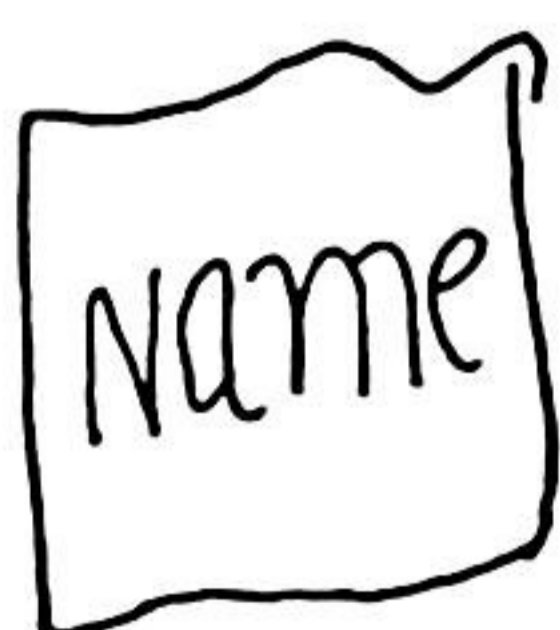


IV D.3 Subject No. 8 B3



IV D.4 Subject No. 35 A4

Type V A

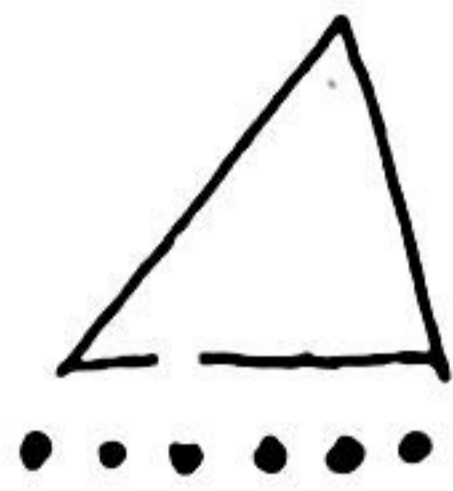


V A.1 Subject No. 8 D1

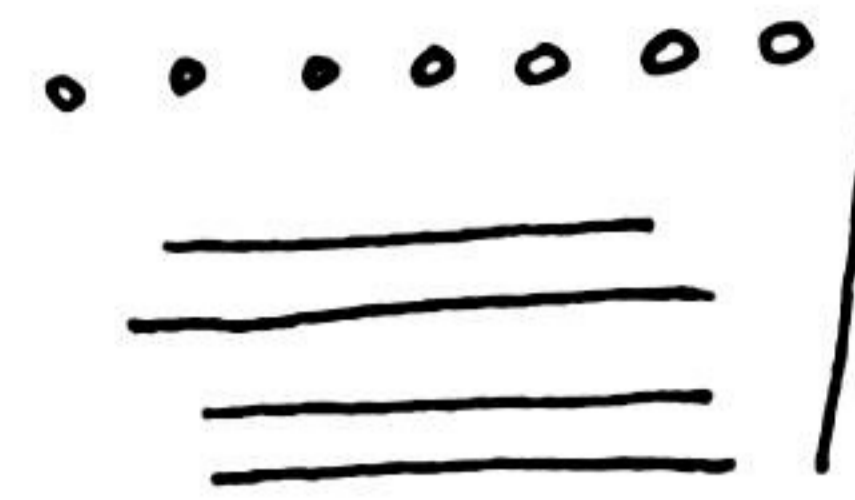


V A.2 Subject No. 7 A4

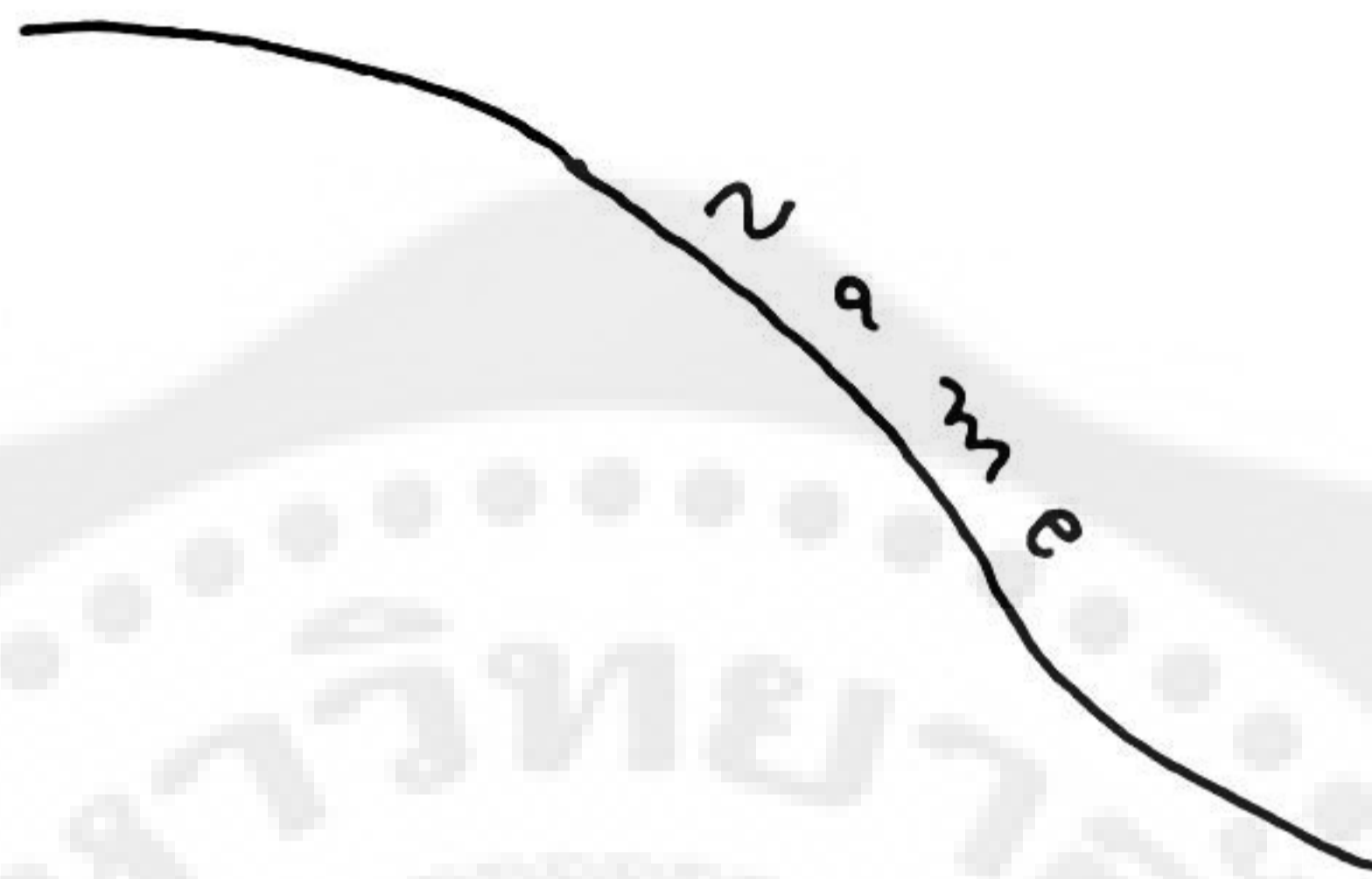
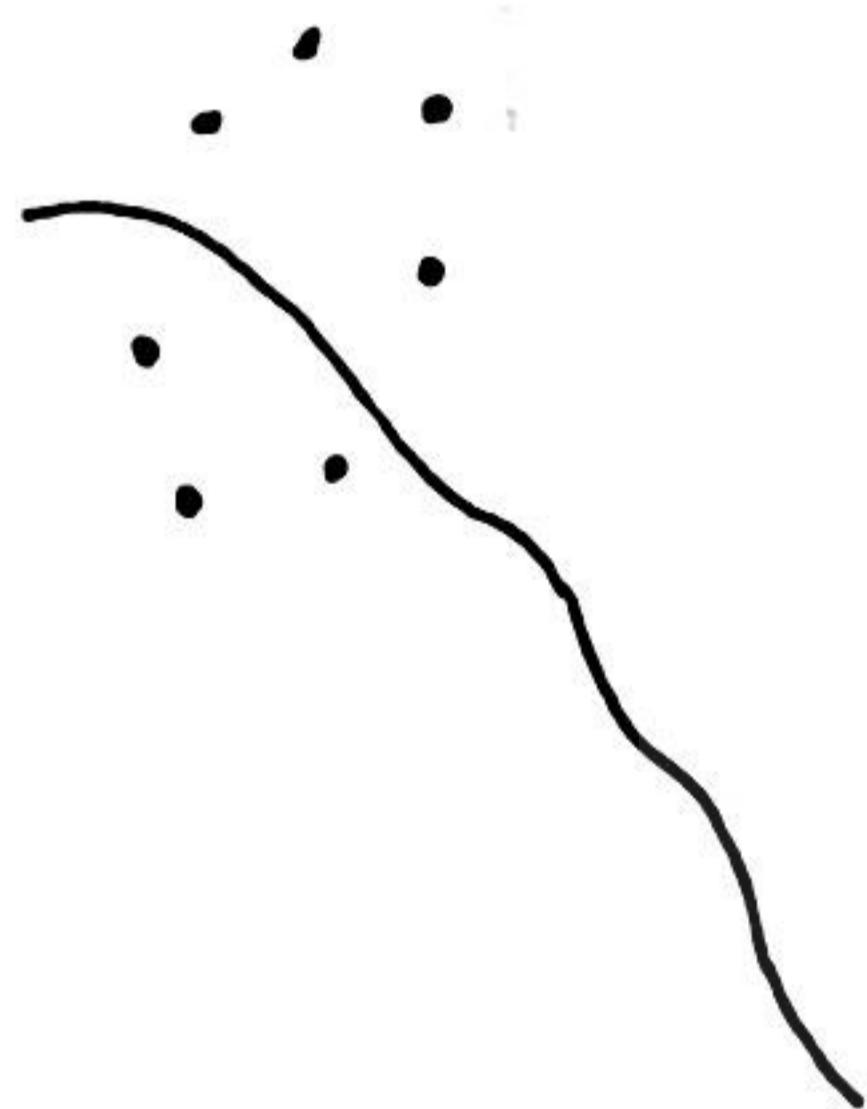
Type V B



N a m e _____

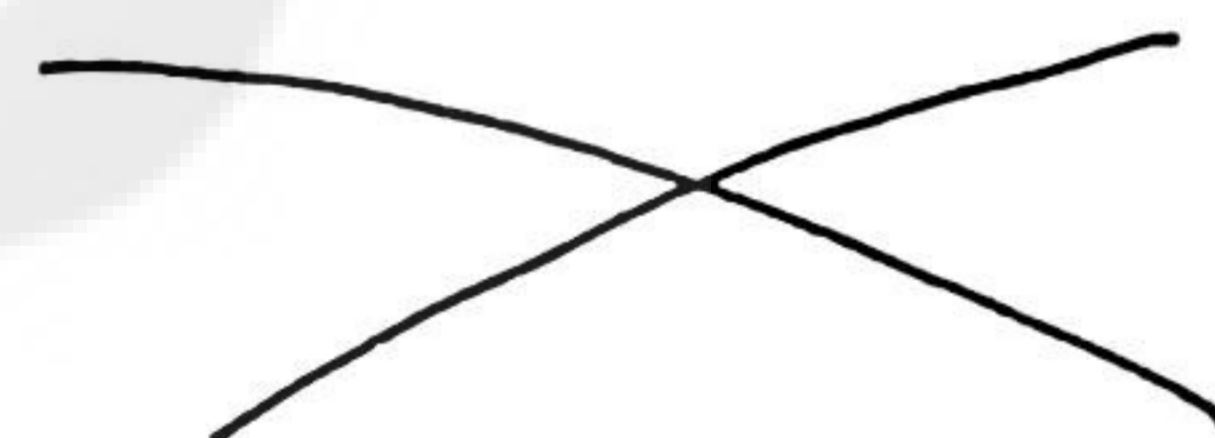
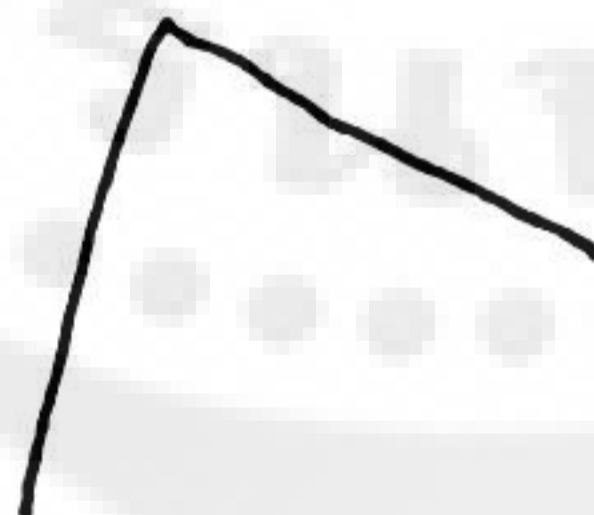


V B.1 Subject No. 20 D₁ V B.2 Subject No. 7 B₂ V B.3 Subject No. 21 B₂



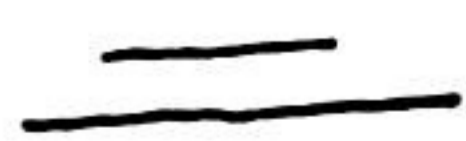
V B.4 Subject No. 15 B₃ V B.5 Subject No. 25 B₃ V B.6 Subject No. 16 B₂

Type V C

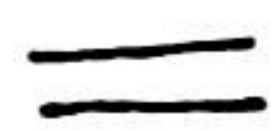


V C.1 Subject No. 32 A₁ V C.2 Subject No. 3 A₄ V C.3 Subject No. 7 D₄

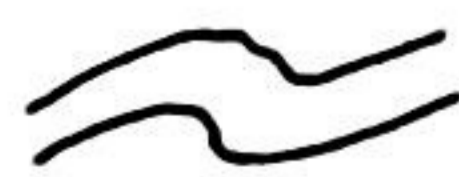
Type V D



V D.1



V D.2



V D.3

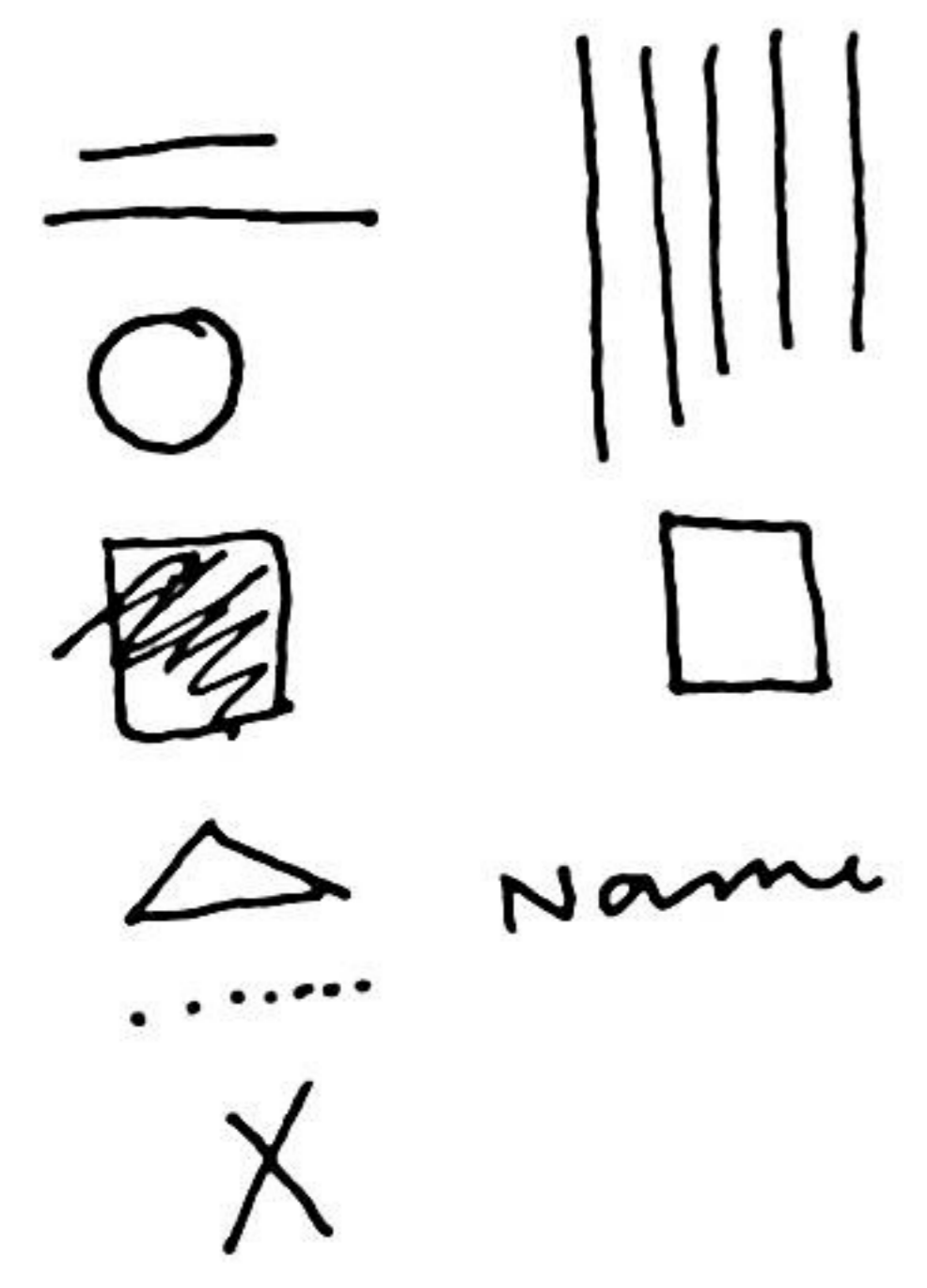


V D.4

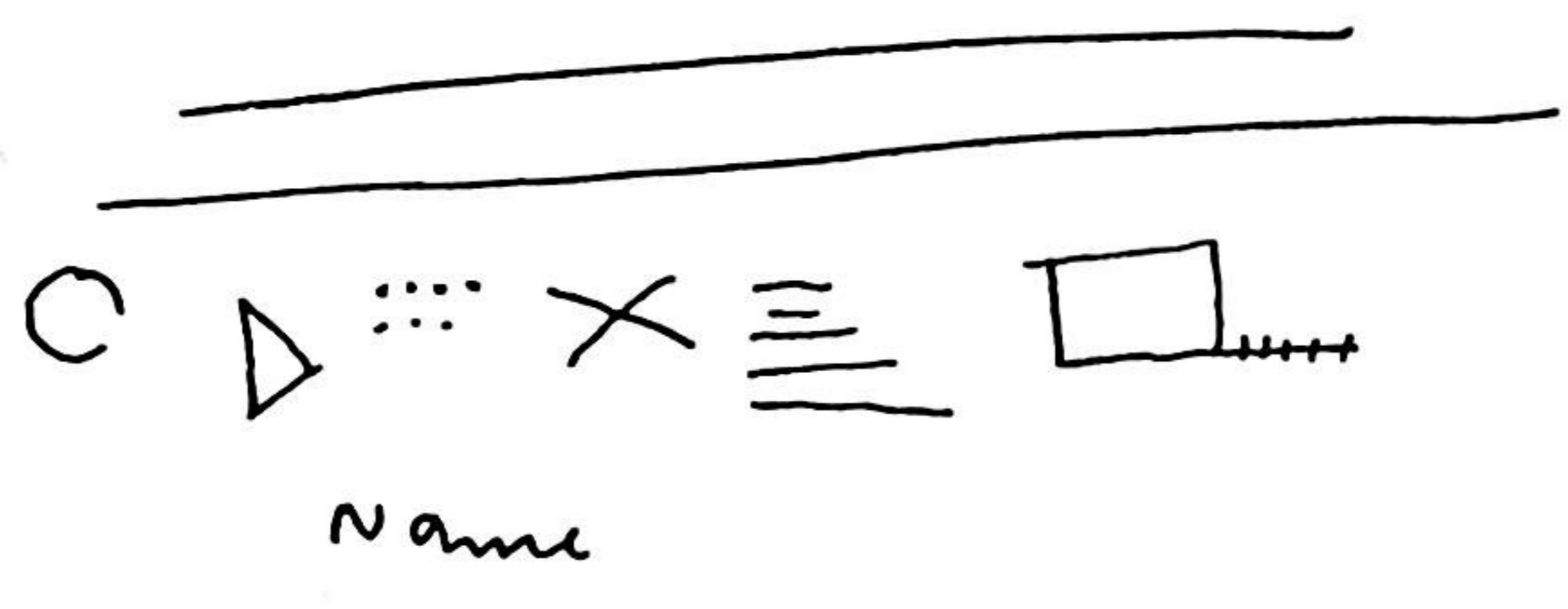


V D.5

Type VI A



Name

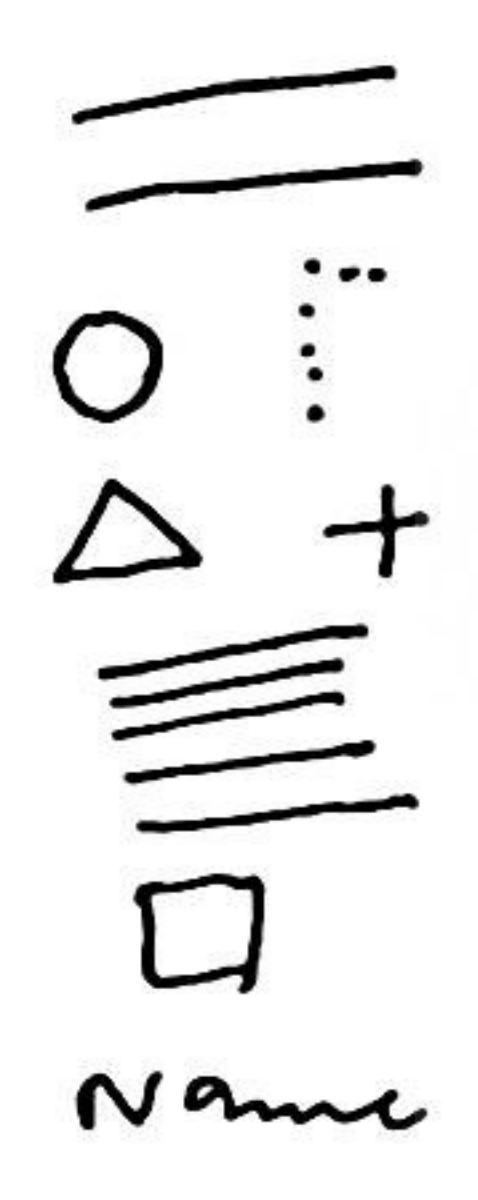


Name

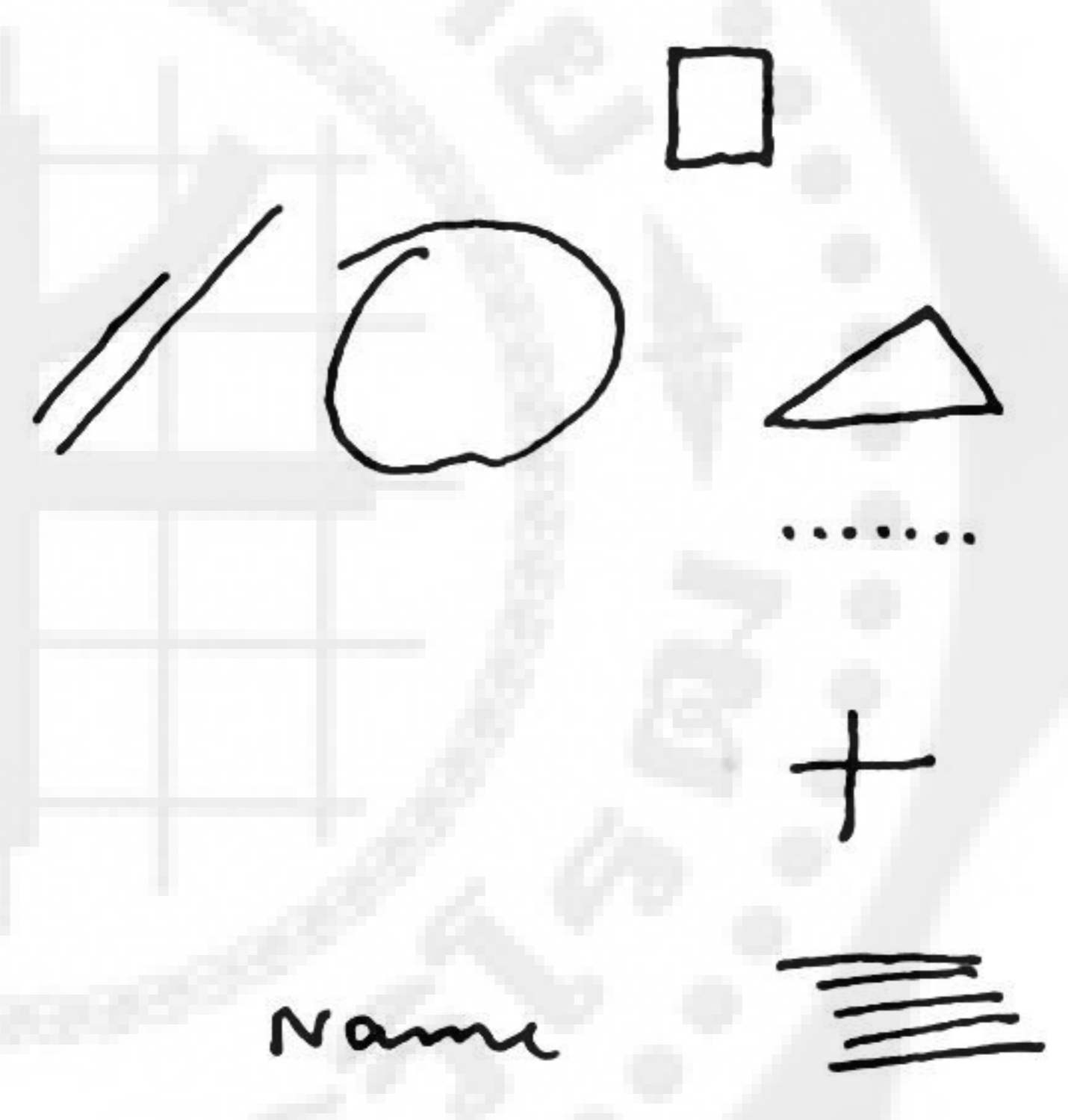
VI A.1 Subject No. 9 A4

VI A.2 Subject No. 14 A4

Type VI B



Name

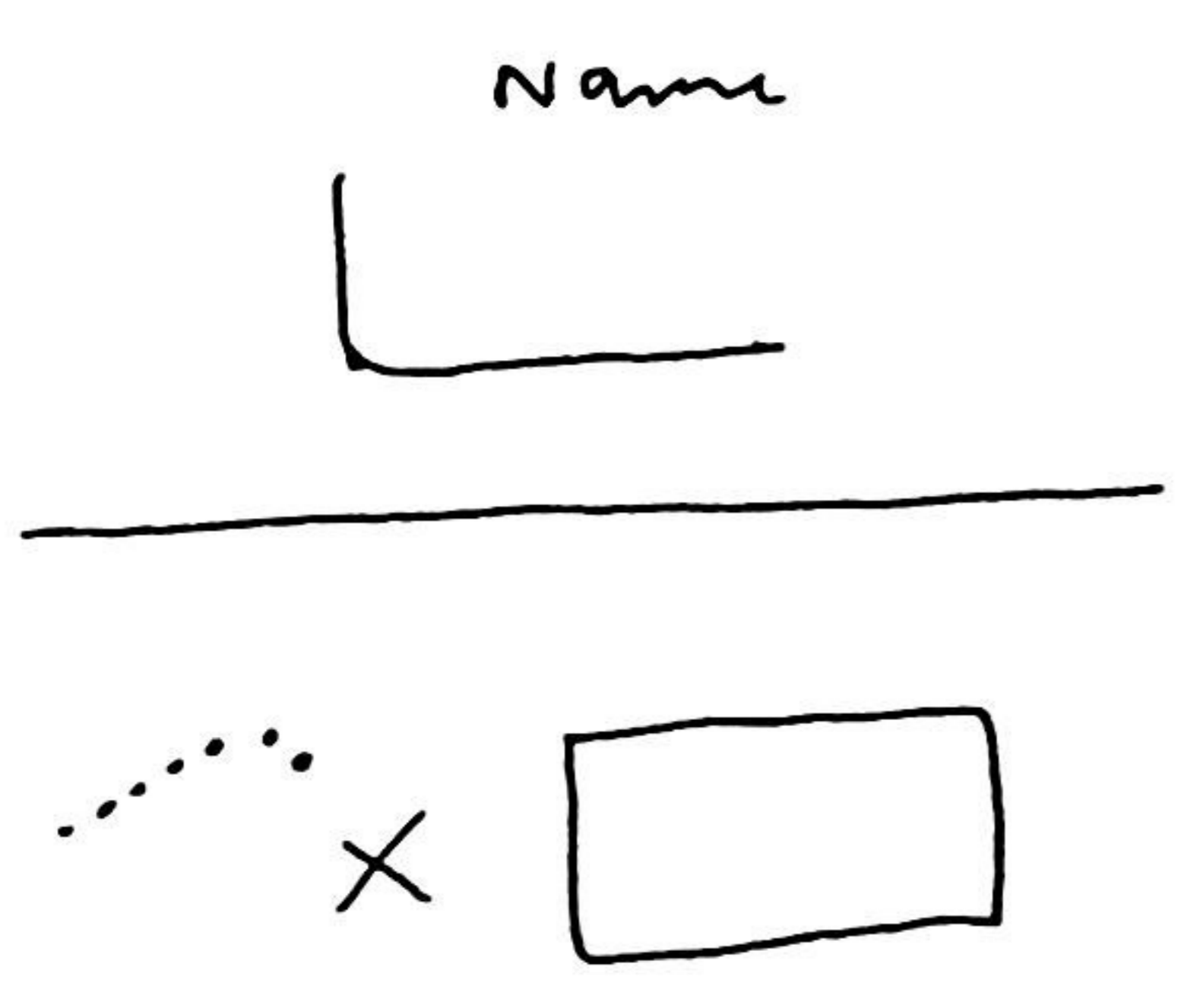


Name

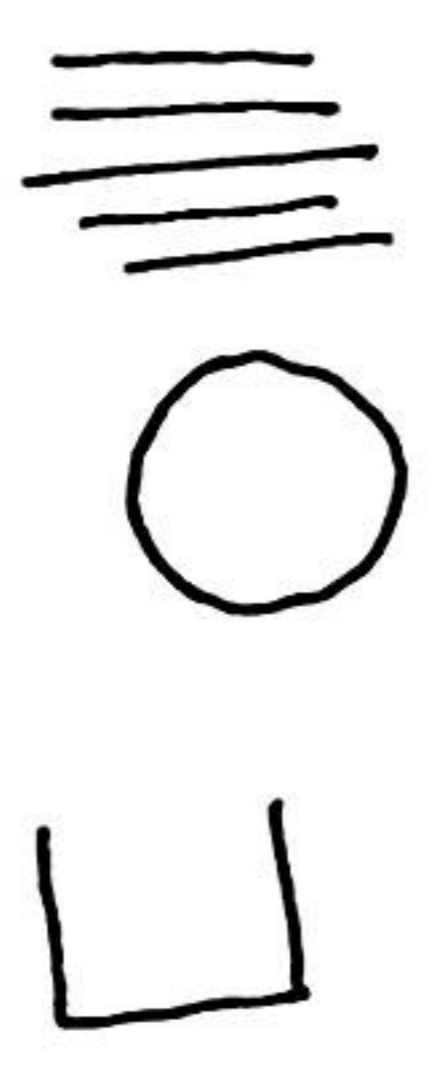
VI B.1 Subject No. 5 A4

VI B.2 Subject No. 6 A4

Type VII



Name



Name

VII.1 Subject No. 22 A4

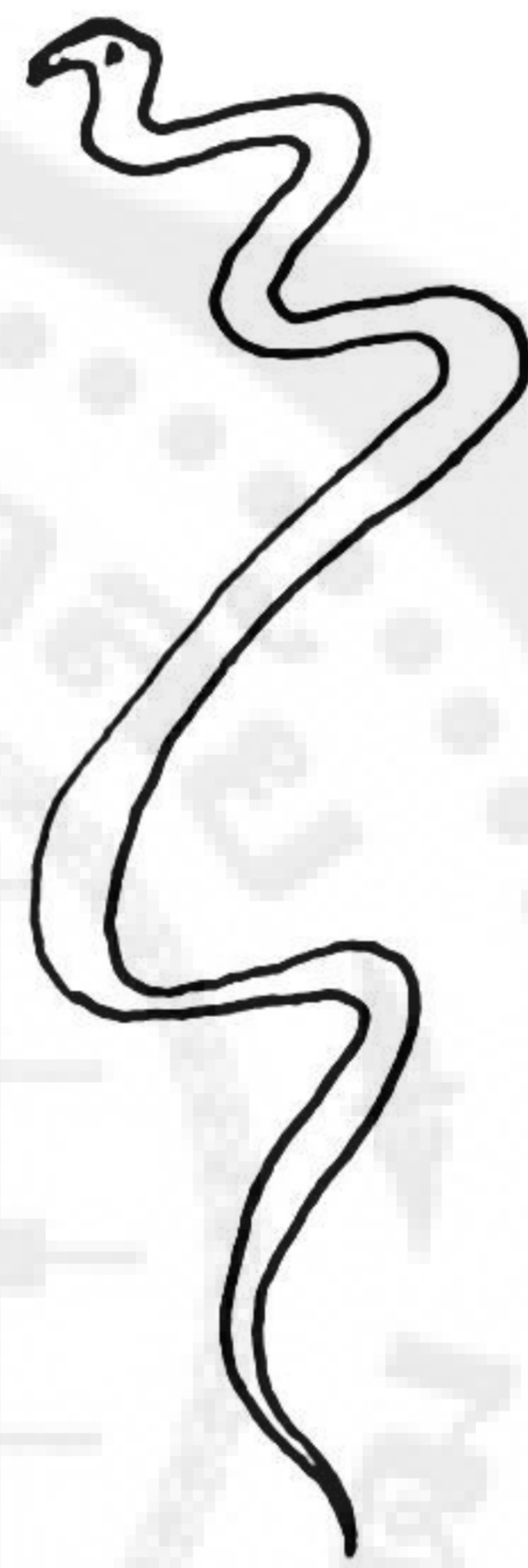
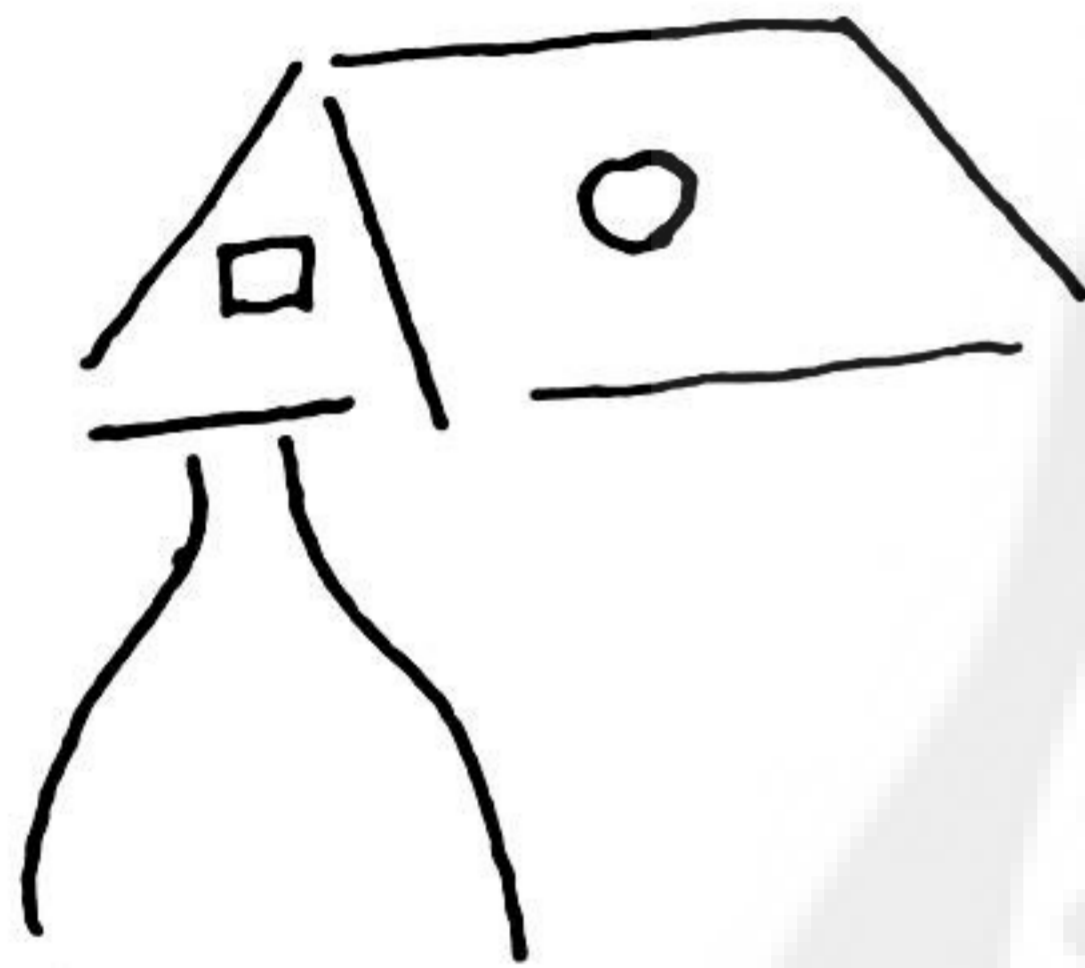
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Type VIII A



VIII A.1 Subject No. 10 A₄

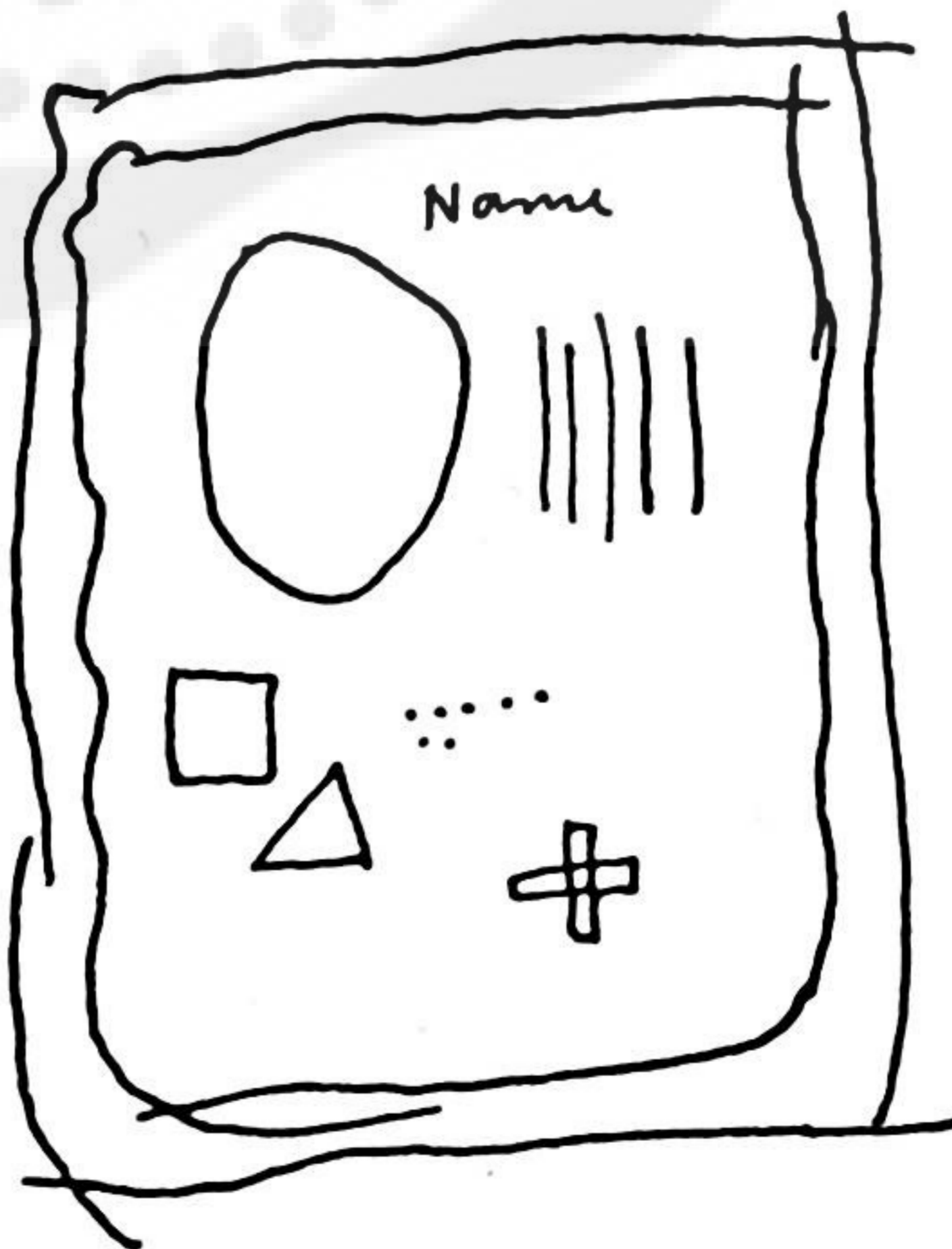
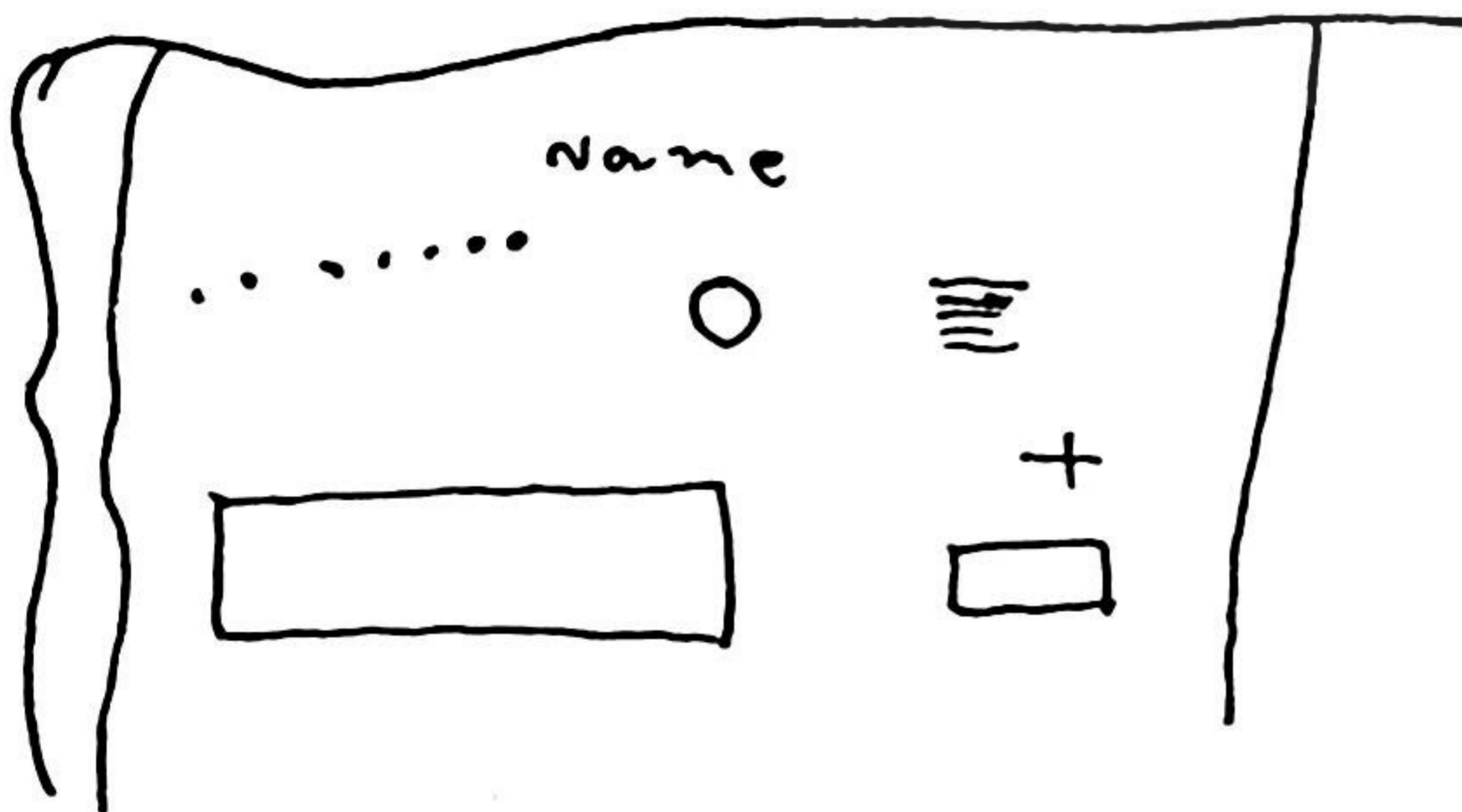
Type VIII B



VIII B.1 Subject No. 46 A₄

VIII B.2 Subject No. 39 C₃

Type VIII C



VIII B.1 Subject No. 11 B₃

VIII B.2 Subject No. 28 B₃

APPENDIX VI

Frequency Distributions of Different Types of Grouping Signs
According to the Classification Explained in Pages 30 - 31.

VI.1 The Nine Classes
(First Sheets)

School and Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Help by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
Ala						4	14	9	10	4
Alb				1	1	6		24	1	1
D1				3	1	8	8	4	4	2
B ₂					1	14	11	6	3	
C ₂				1	1	10	3	10	6	1
B ₃				2	1	9	5	7	6	2
C ₃			1	4	2	7	6	19	1	1
A ₄	1	1	1	5	2	14	6	12	1	1
D ₄				1	6	4	2	7	3	

VI.2 The Four Grades

(First Sheets)

Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
I				4	2	18	22	37	15	7
II				1	2	24	14	16	9	1
III			1	6	3	16	11	26	7	3
IV	1	1	1	6	8	18	8	19	4	1

VI.3 The Six Age Groups

(First Sheets)

Age	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Sign
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
4/9-6/8				2		5	8	7	3	2
6/9-7/8				2	3	19	11	17	5	3
7/9 - 8/8				3	1	24	16	39	15	4
8-9 - 9/8		1	1	5	7	10	10	18	9	2
9/9-11/8	1			3	3	11	5	10	2	
11/9-14/8			1	2	1	7	5	7	1	1

VI. 4 The Nine Classes

(Memory Sheets)

School and Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
Ala						2	14	12	12	2
Alb					1	8		22	3	
D ₁				1	1	9	5	7	5	2
B ₂						11	9	8	4	
C ₂				2	2	7	5	14	2	
B ₃				3		8	7	10	3	1
C ₃				4	4	6	8	16	2	1
A ₄	1	1	1	6	1	20	5	7	1	1
D ₄				1	2	6	6	5	3	

VI. 5 The Four Grades

(Memory Sheets)

Grade	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
I				1	2	19	19	41	20	4
II				2	2	18	14	22	6	
III				7	4	14	15	26	5	2
IV	1	1	1	7	3	26	11	12	4	1

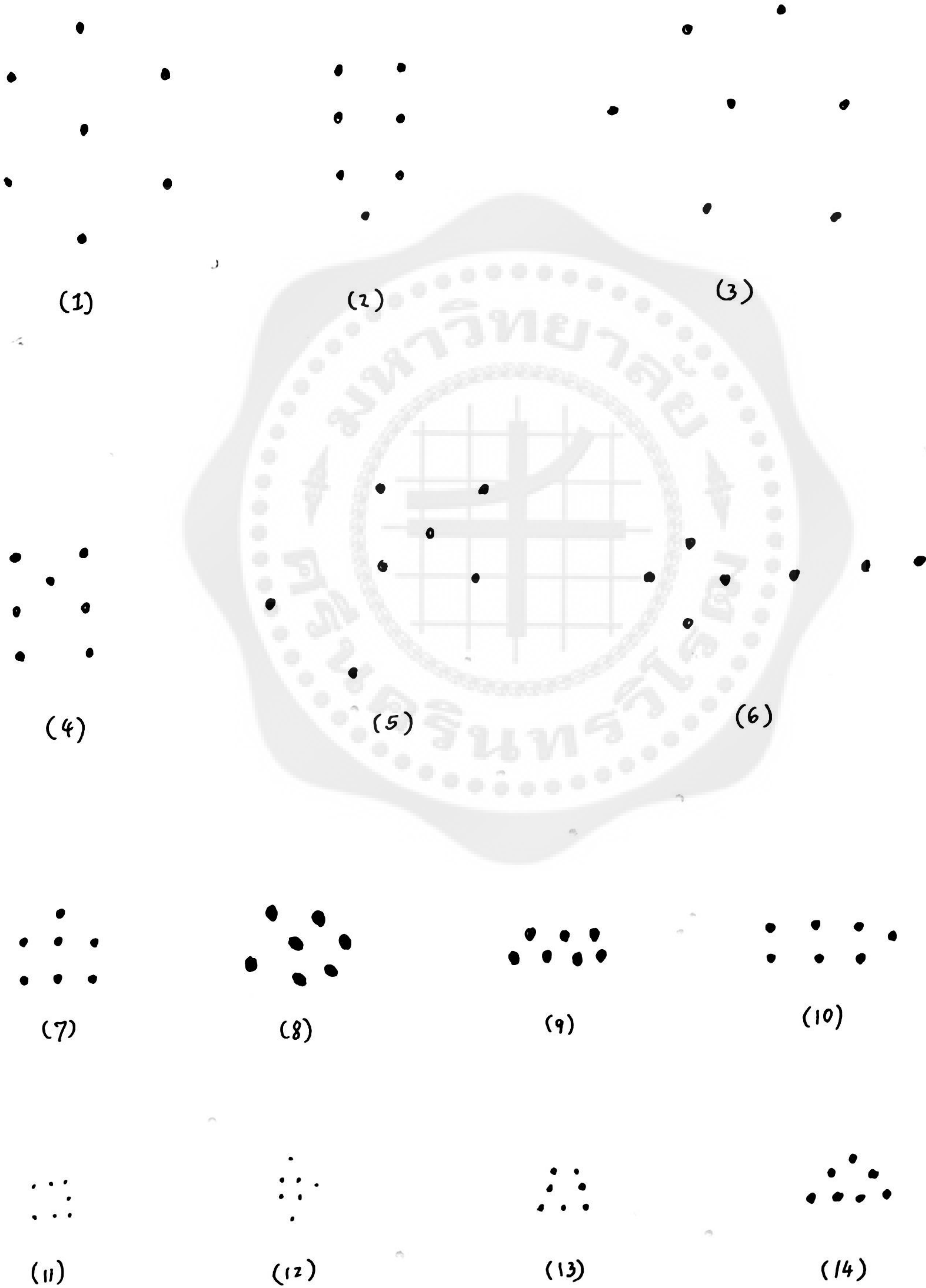
VI. 6 The Six Age Groups
(Memory Sheets)

Age	Realistic		Symmetrical		Asymmetrical		Framing	Order of Dictation	Random Order	Helped by Excess Signs
	5-9 Signs	3-4 Signs	5-9 Signs	3-4 Signs	5-9 Signs	2-4 Signs				
4/9 - 6/8				1		6	6	9	5	
6/9 - 7/8					2	12	7	24	10	3
7/9 - 8/8				5	1	24	20	41	10	1
8/9 - 9/8		1		5	5	10	15	18	7	2
9/9 - 11/8	1			3	3	13	6	6	3	
11/9 - 14/8			1	3		12	5	3		1

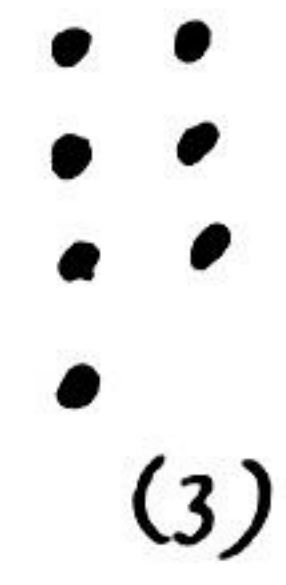
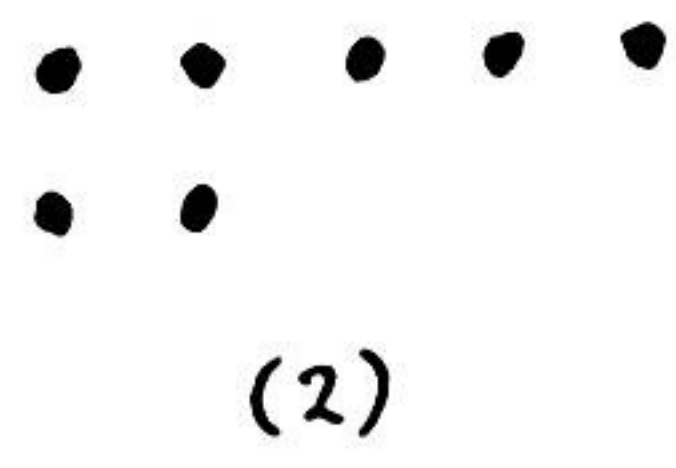
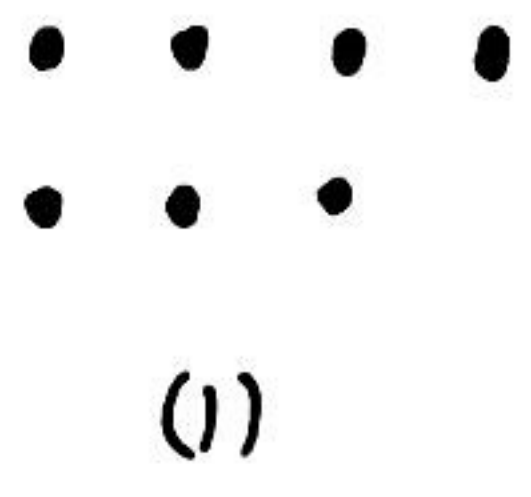
APPENDIX VII

Examples of the Arrangement of Seven Spots

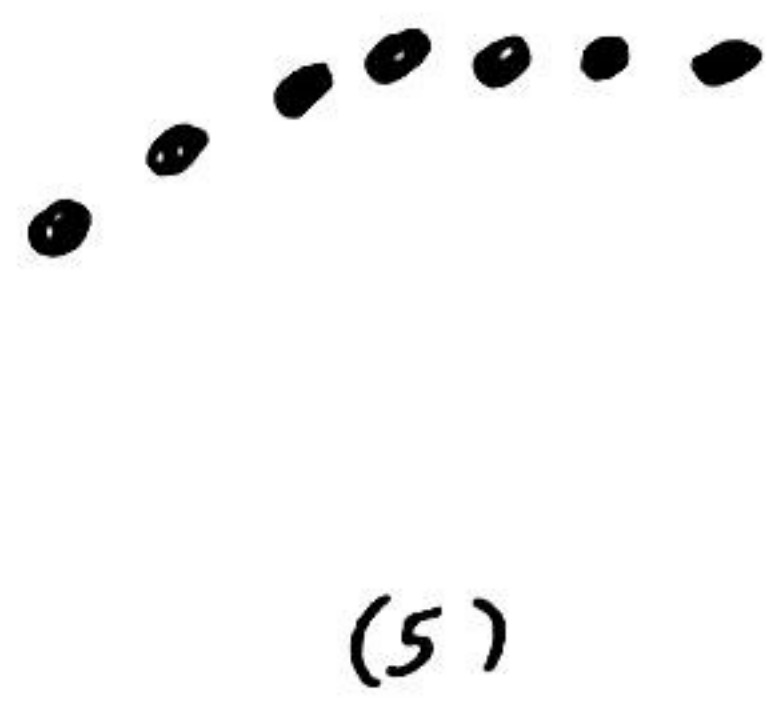
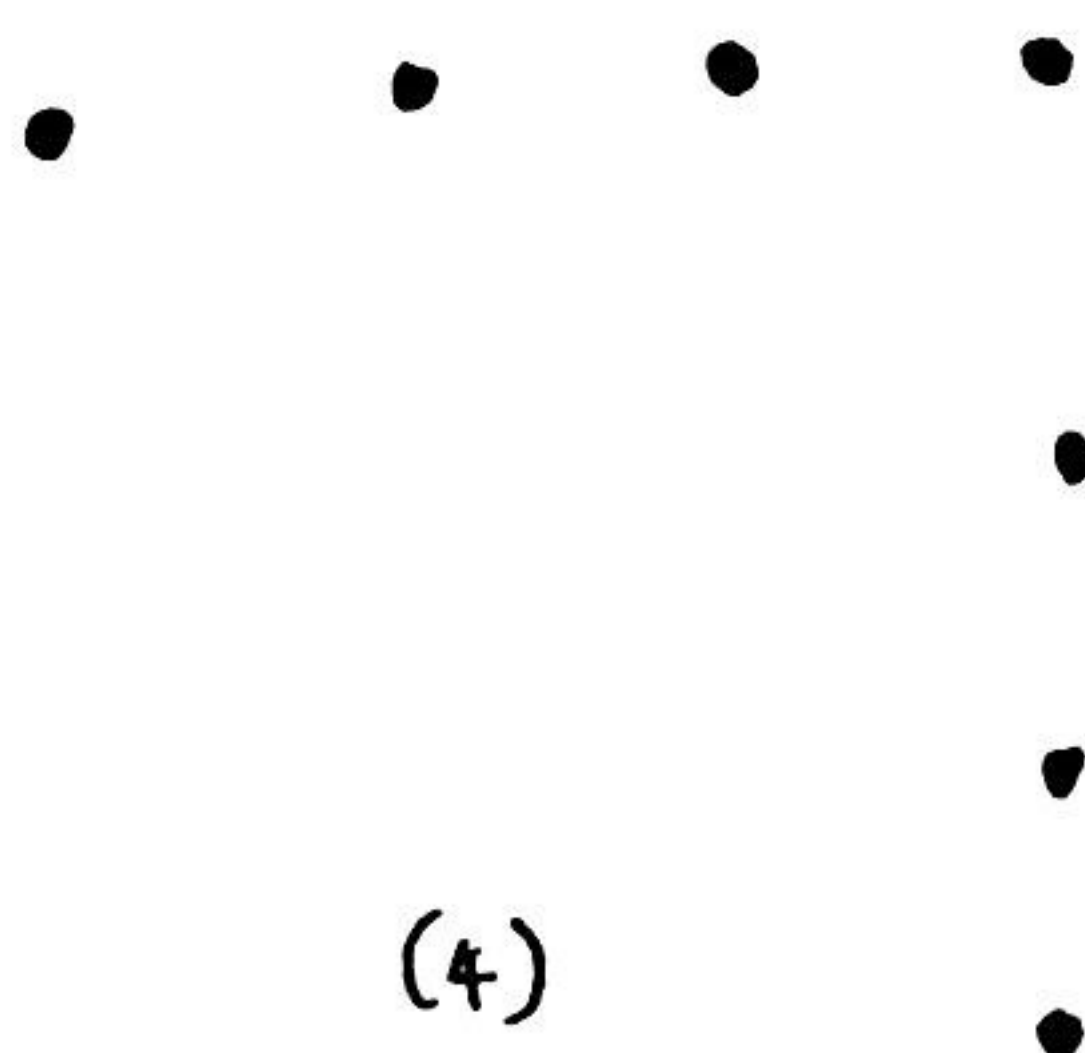
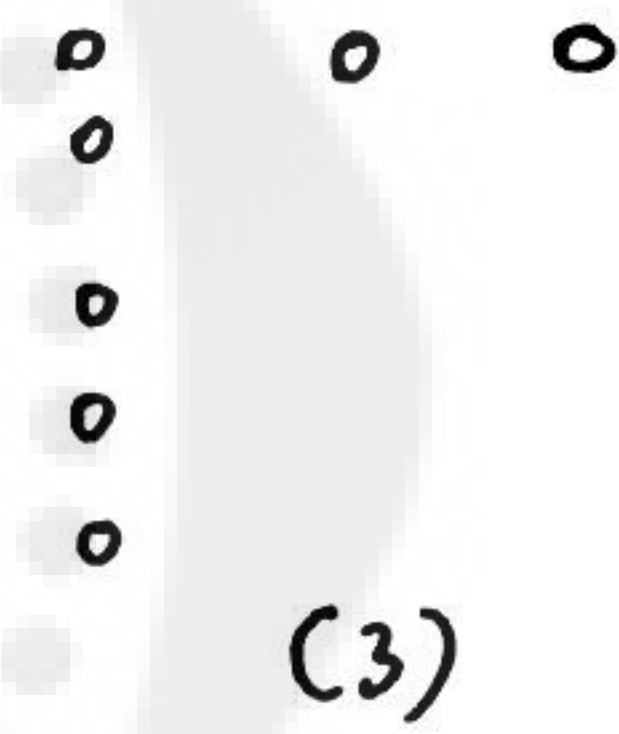
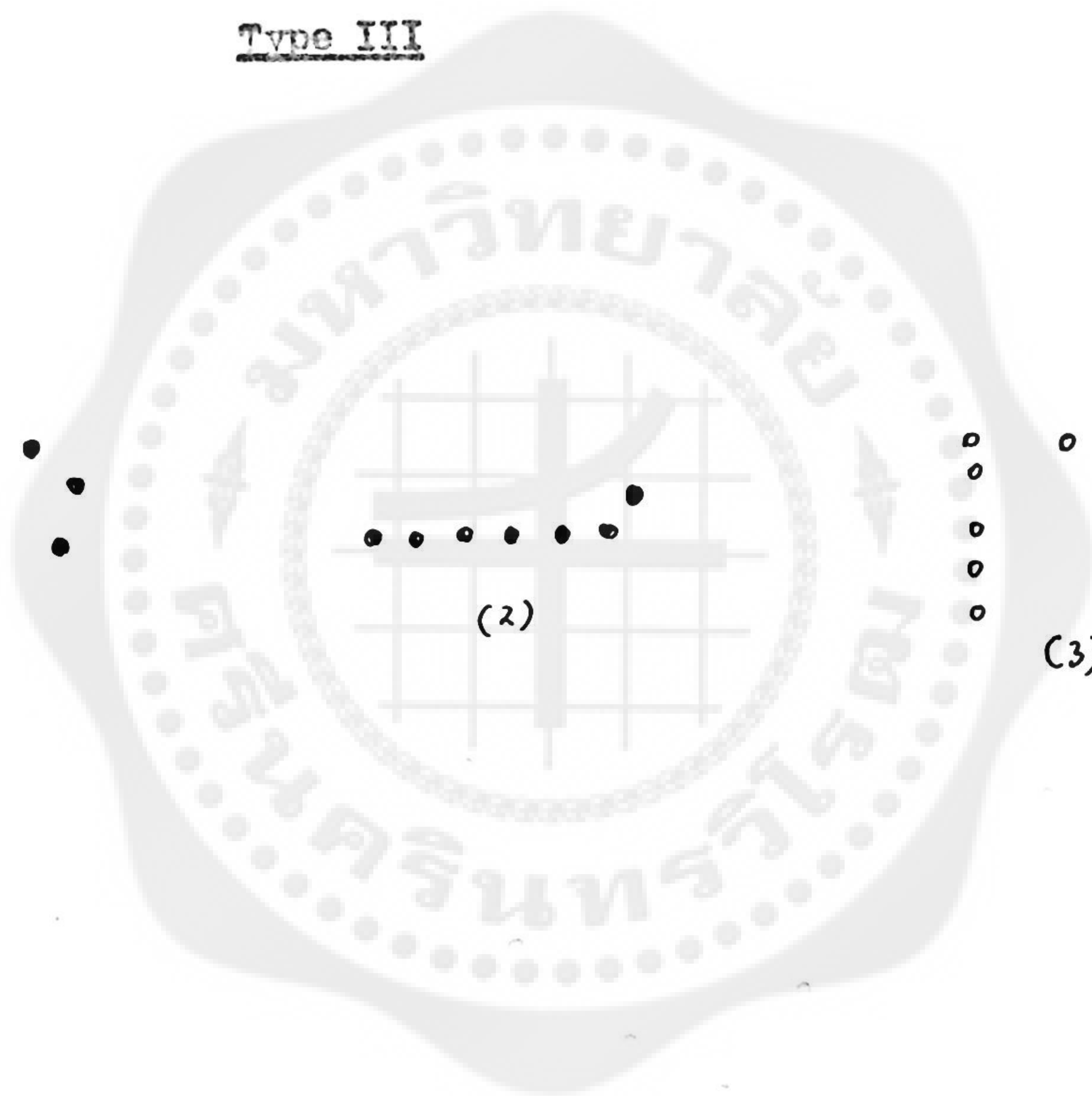
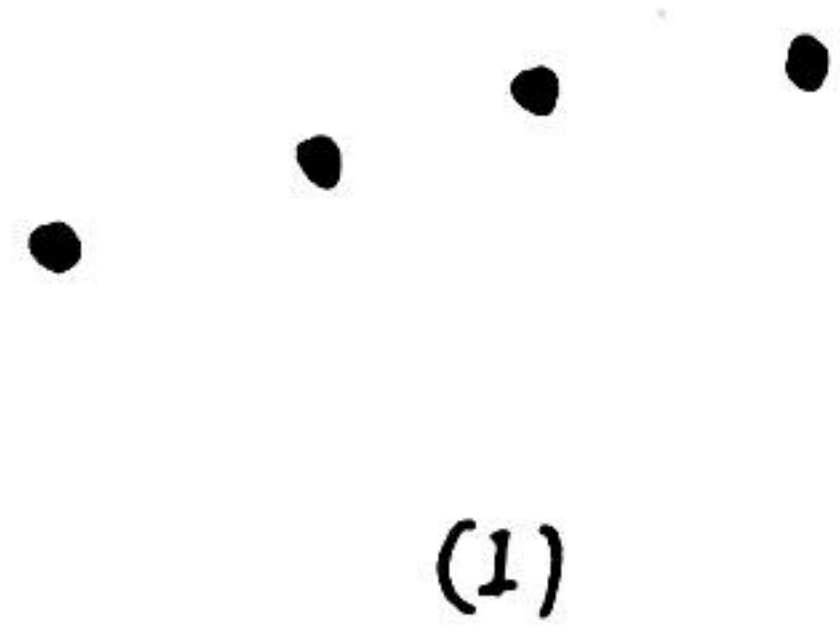
Type I



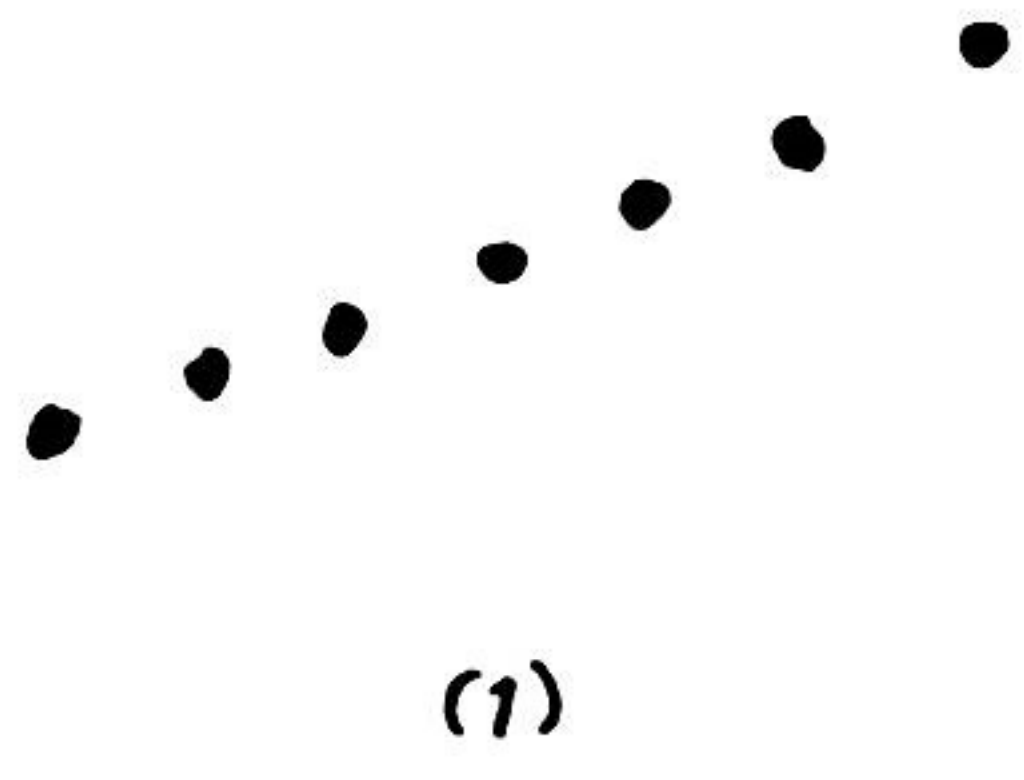
Type II



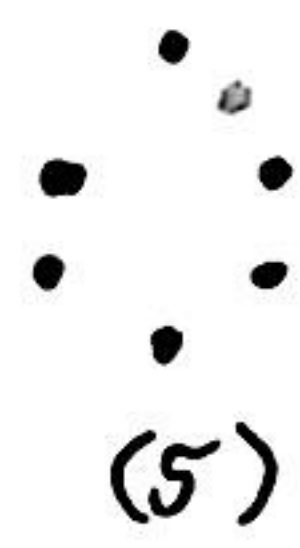
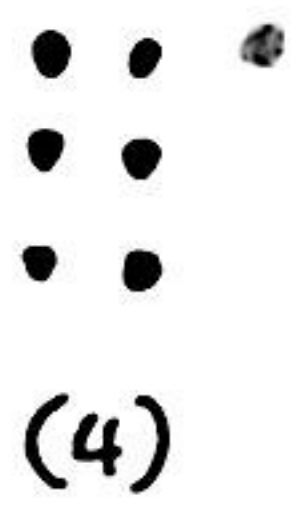
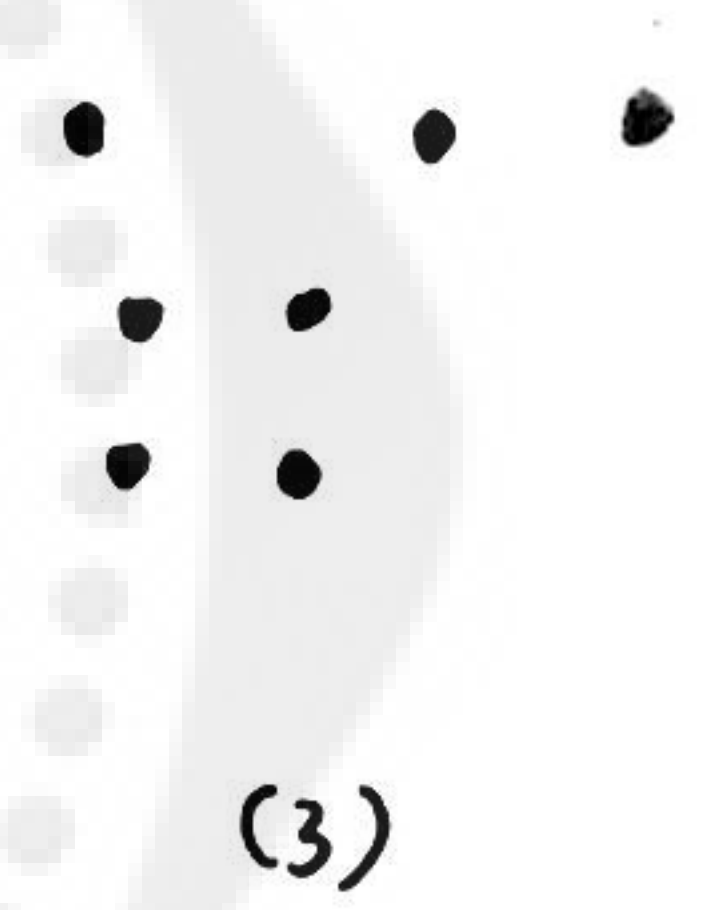
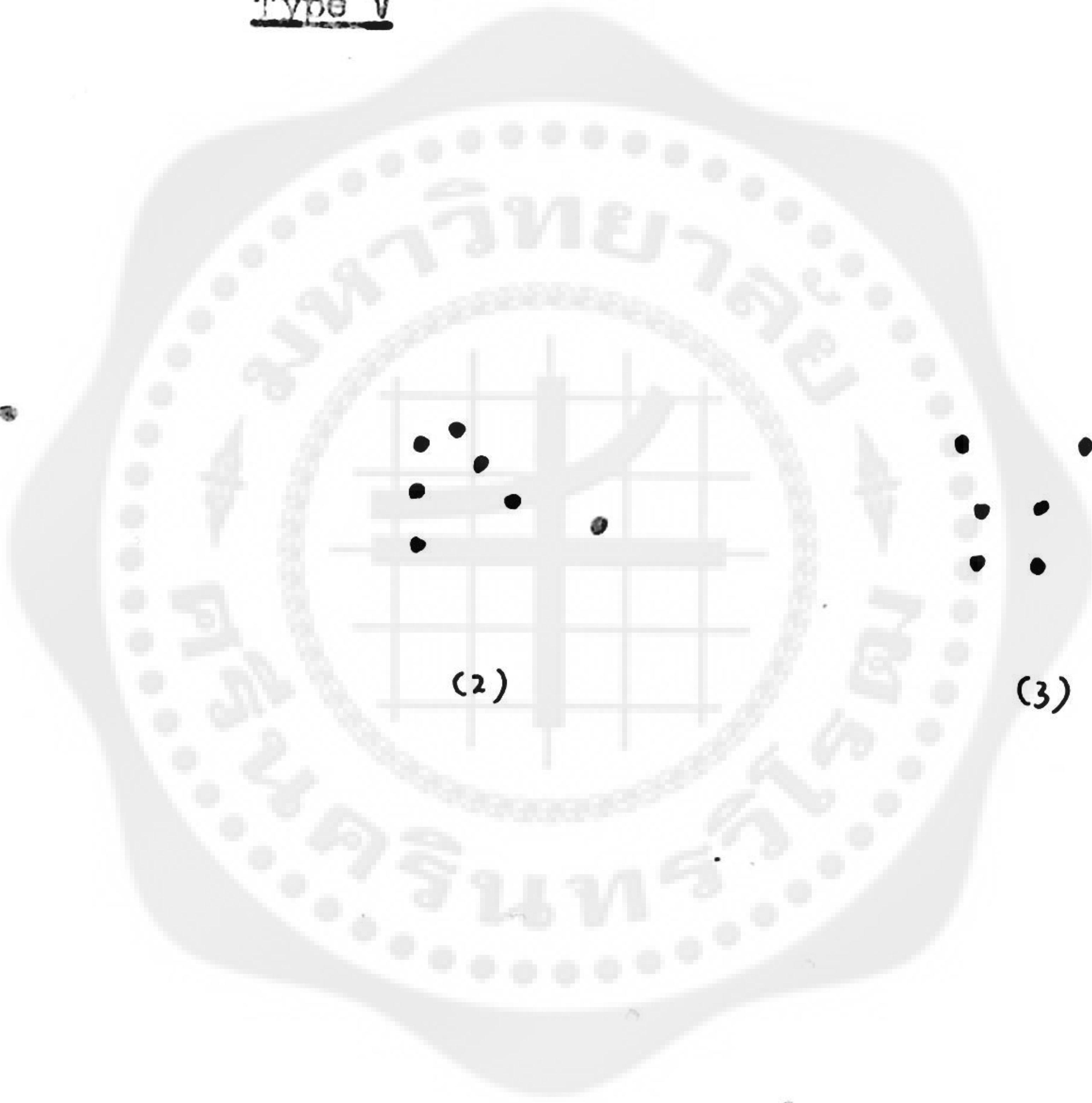
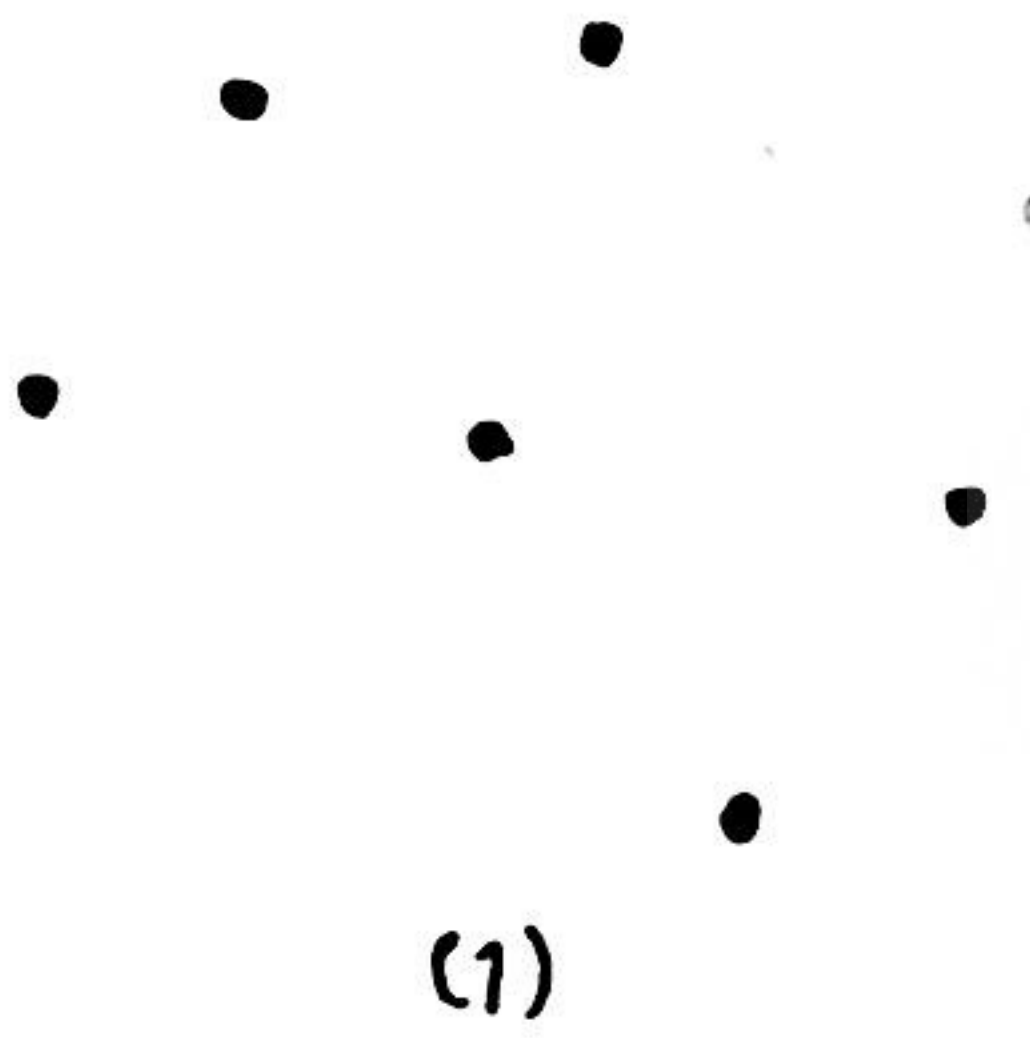
Type III



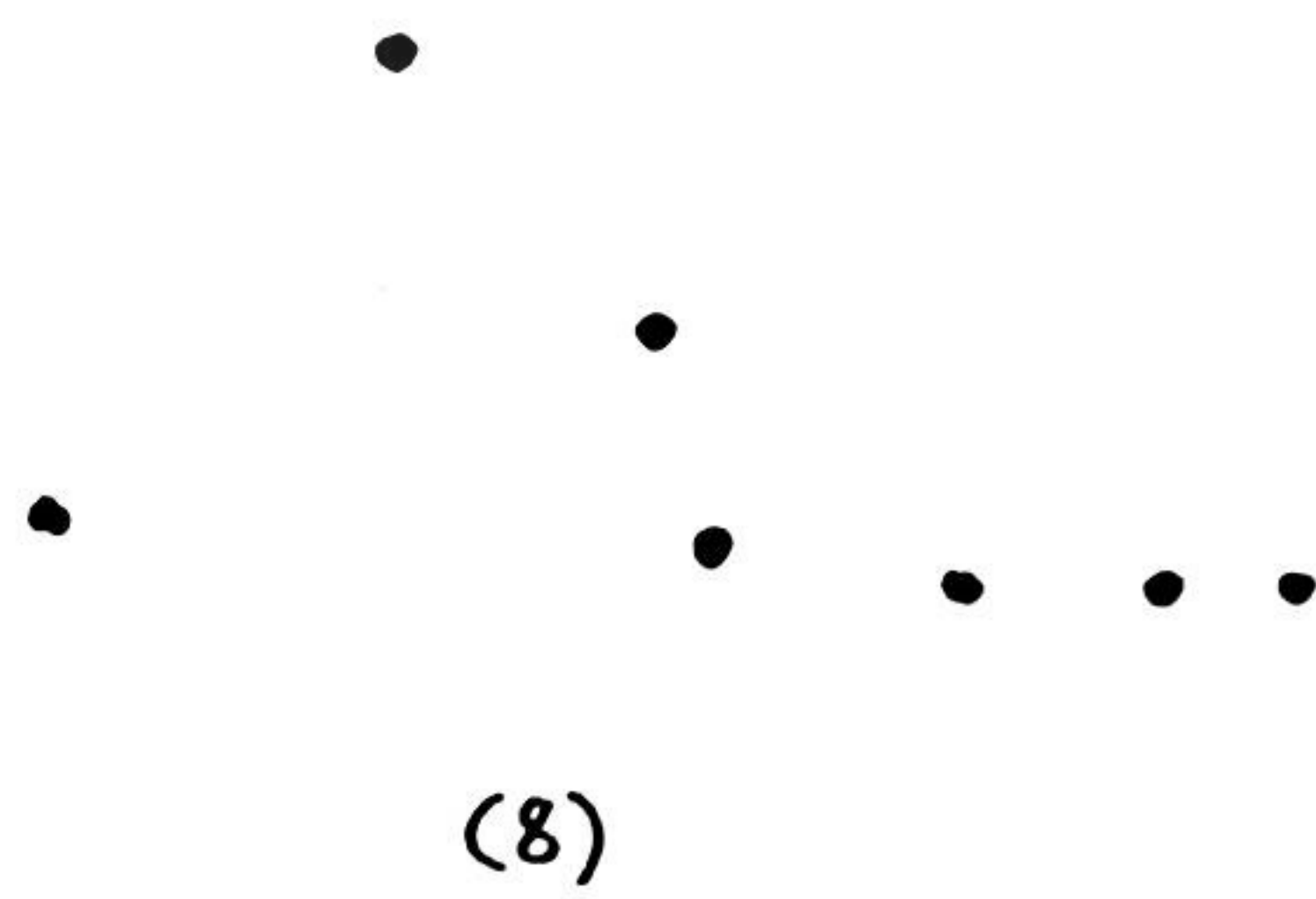
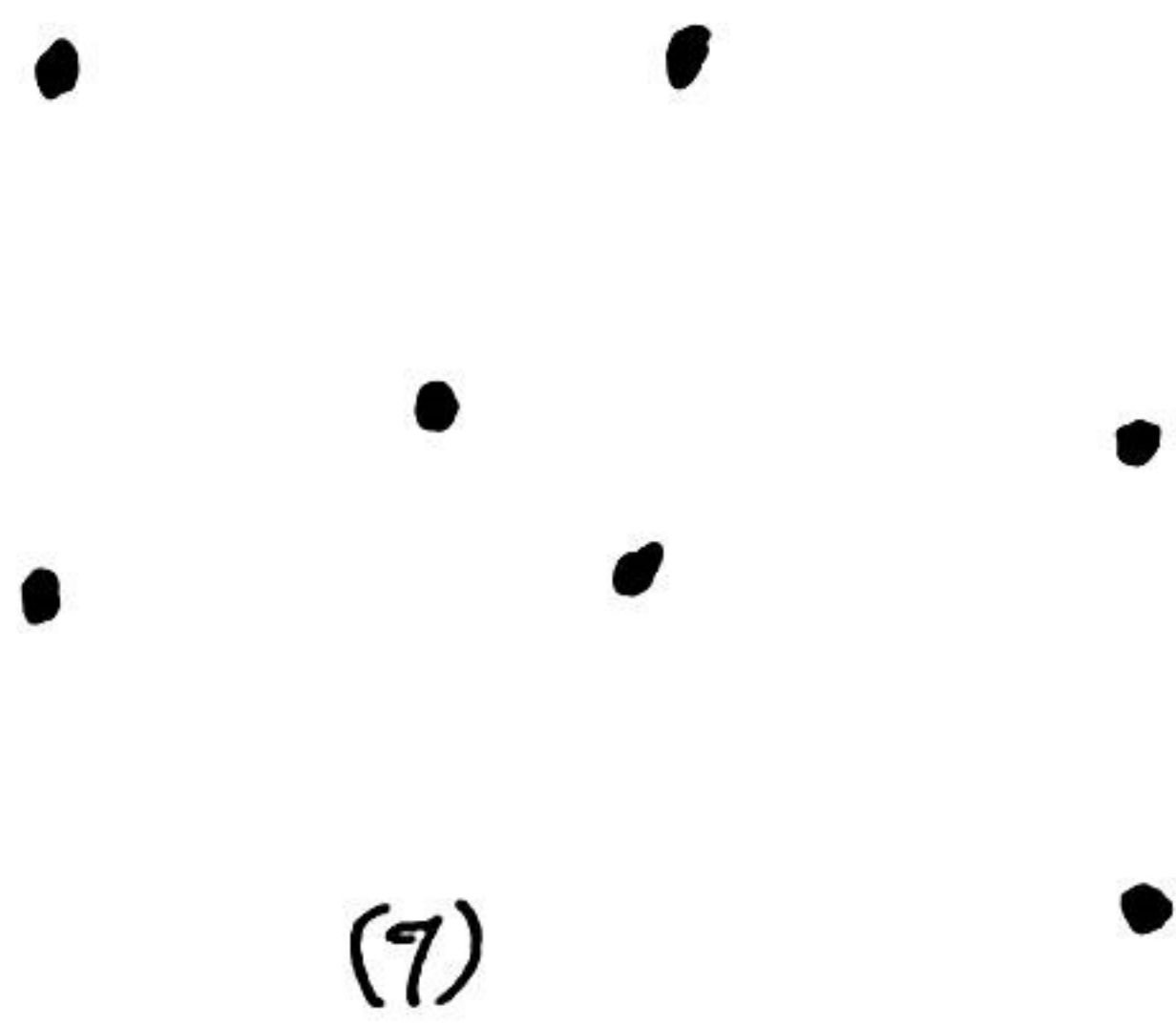
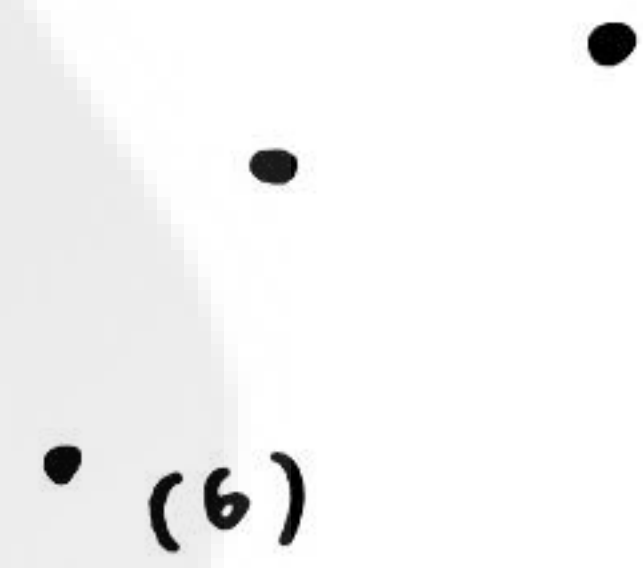
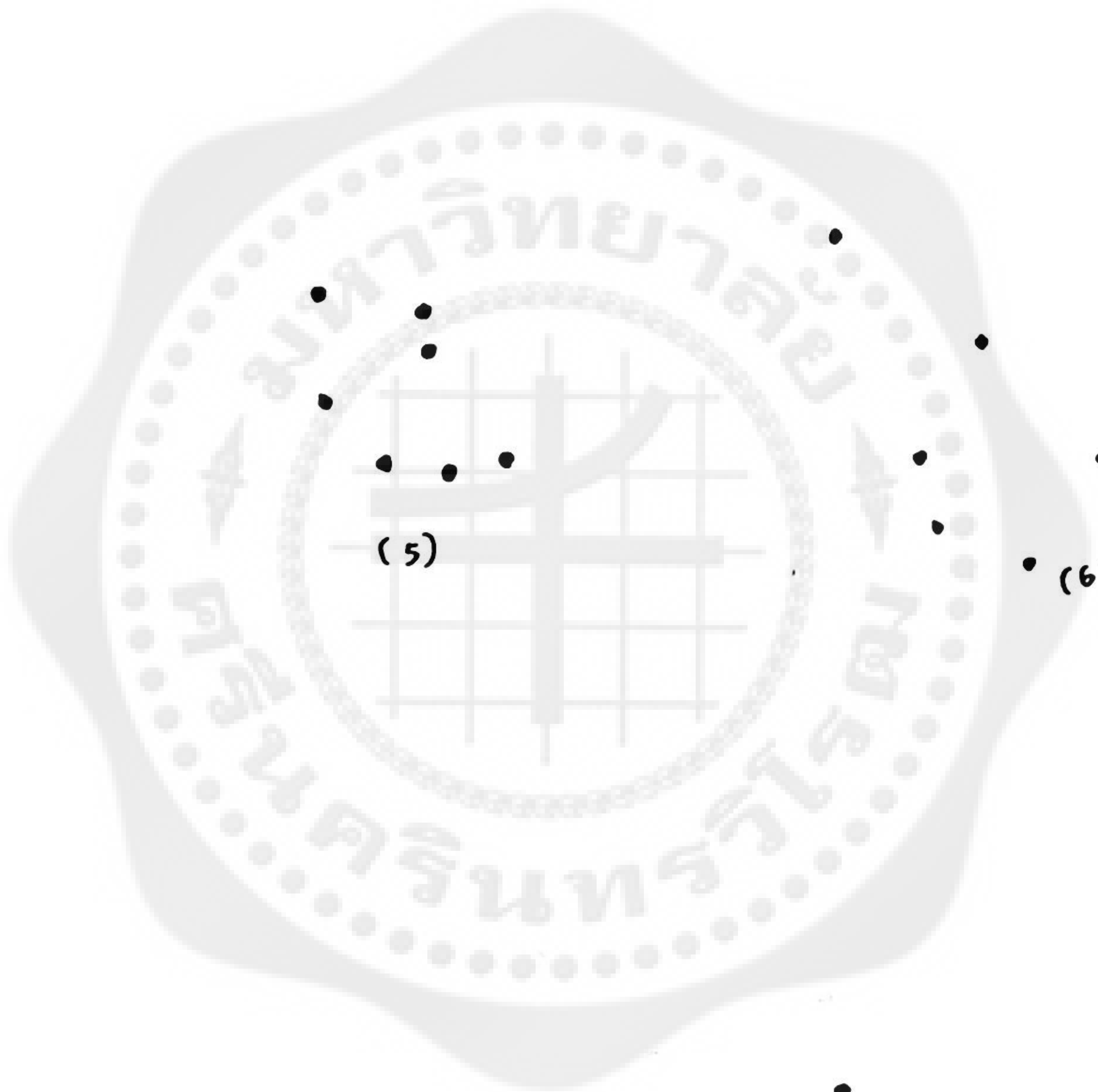
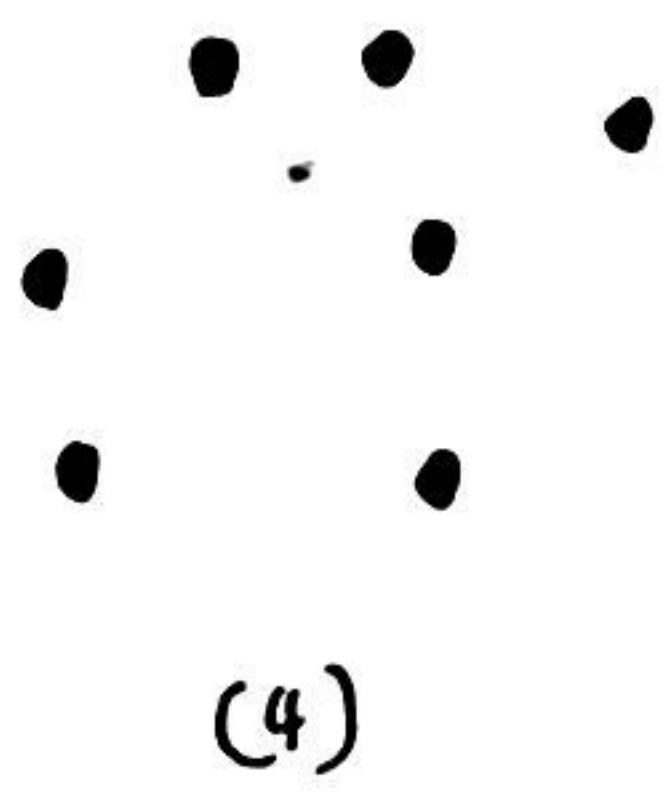
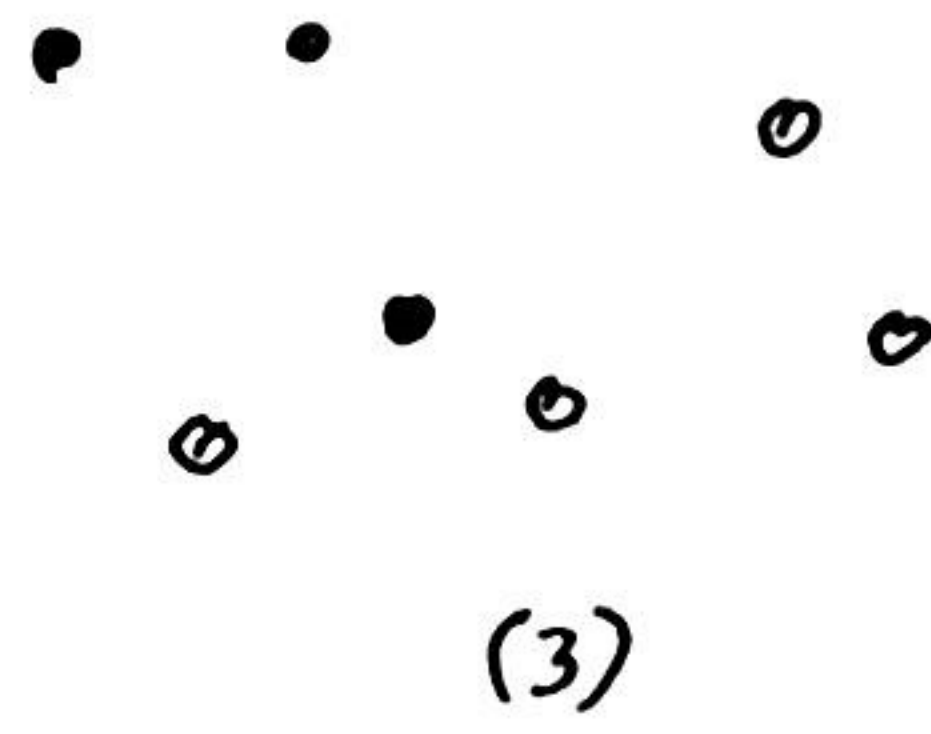
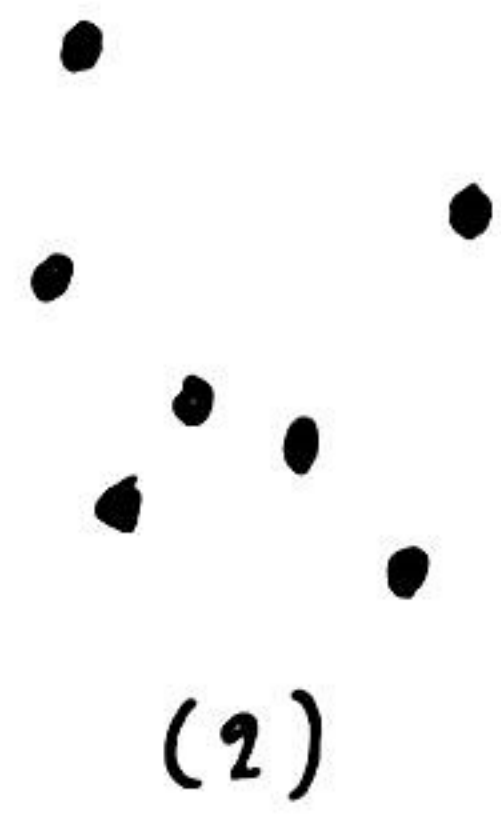
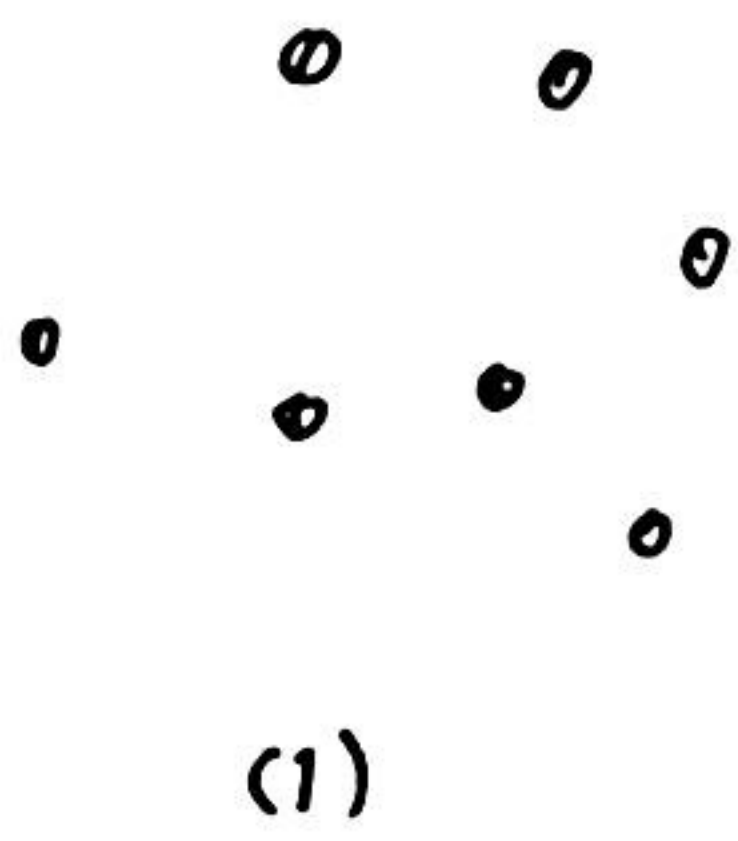
Type IV



Type V



Type VI



APPENDIX VIII

Frequency Distributions of Different Types of the Arrangement of Seven Spots.

VIII.1 - First Sheets of the Nine Classes.

School and Grade	I	II	III	IV	V	VI	Total of S
A _{1a}	1	1	0	38	0	1	41
A _{1b}	0	0	4	27	1	2	34
D ₁	1	2	0	25	0	2	30
B ₂	5	3	1	19	6	1	35
C ₂	7	0	2	12	5	6	32
B ₃	4	5	1	19	1	2	32
C ₃	8	7	3	16	5	1	40
A ₄	9	5	5	18	1	6	44
D ₄	6	1	0	7	3	6	23

VIII.2 - First Sheets of the Four Grades

Type Grade	I	II	III	IV	V	VI	Total of S
I	2	3	4	90	1	5	105
II	12	3	3	31	11	7	67
III	12	12	4	35	6	3	72
IV	15	6	5	25	4	12	67

VIII.3 First Sheets of the Six Age Groups

Type Age	I	II	III	IV	V	VI	Total of S
4/9 - 6/8		2	1	21		3	27
6/9 - 7/8	6	2	2	45	2	3	60
7/9 - 8/8	11	8	6	62	9	5	101
8/9 - 9/8	13	5	1	27	10	7	63
9/9 - 11/8	7	5	3	14		6	35
11/9 - 14/8	4	2	3	12	1	3	25

VIII.4 Memory Sheets of the Nine Classes

Type School and Grade	I	II	III	IV	V	VI	Total of S
A _{1a}				33			33
A _{1b}				27	1	1	29
D ₁	1	1	2	23	0	1	28
B ₂	5	2	1	13	1	1	23
C ₂	6	2	1	10	5	6	30
B ₃	4	4	1	18	1	2	30
C ₃	7	7	4	15	2	2	37
A ₄	9	5	2	23	2	3	44
D ₄	4	1		7	4	5	21

VIII.5 Memory Sheets of the Four Grades

Type \ Grade	I	II	III	IV	V	VI	Total of S
I	1	1	2	83	1	2	90
II	11	4	2	23	6	7	53
III	11	11	5	33	3	4	67
IV	13	6	2	30	6	8	65

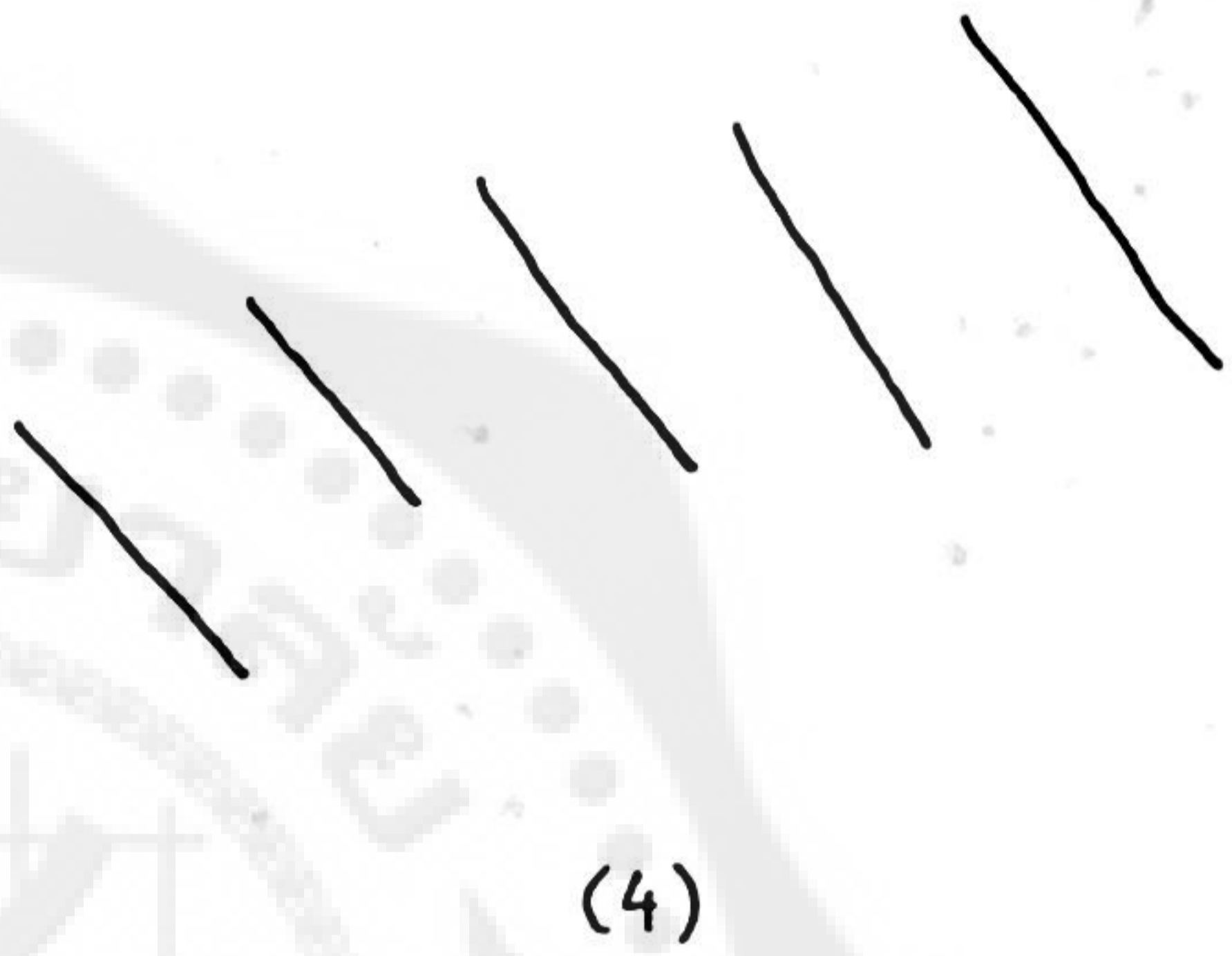
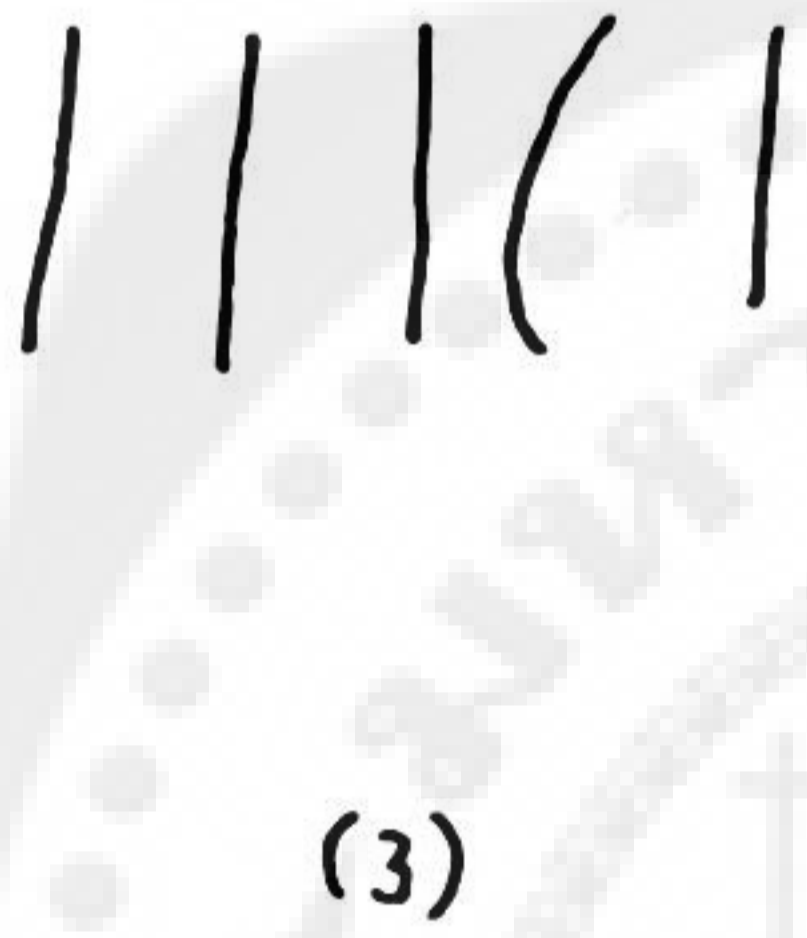
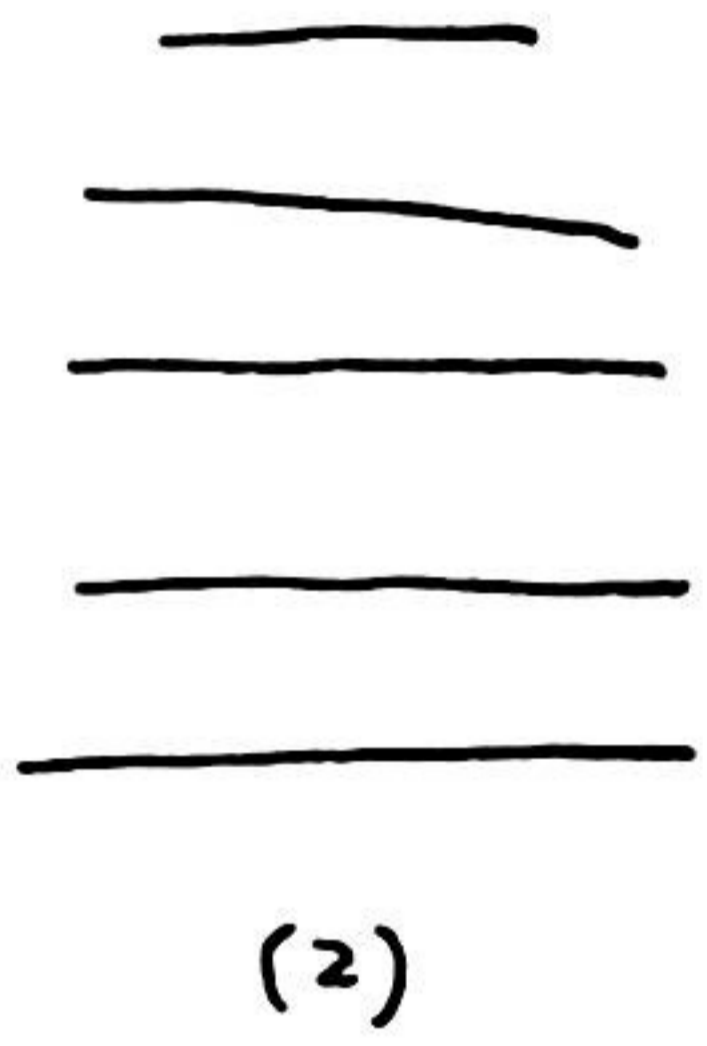
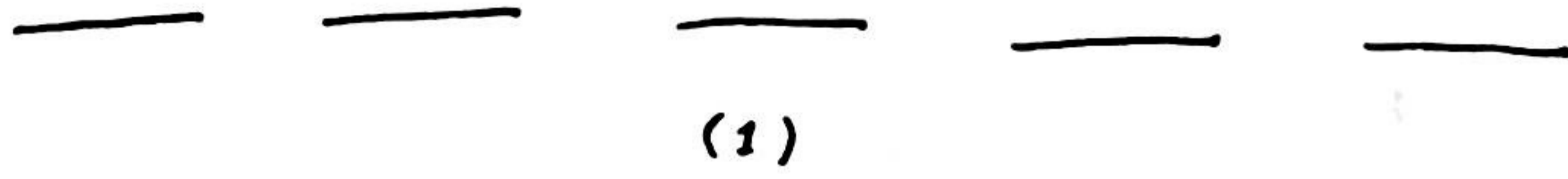
VIII.6 Memory Sheets of the Six Age Groups

Type \ Age	I	II	III	IV	V	VI	Total of S
4/9 - 6/8		1	1	21		1	24
6/9 - 7/8	3	2	1	36	2	4	48
7/9 - 8/8	13	9	4	55	3	4	88
8/9 - 9/8	10	3	2	26	8	7	56
9/9 - 11/8	5	3	3	17	2	4	34
11/9 - 14/8	5	4		14	1	1	25

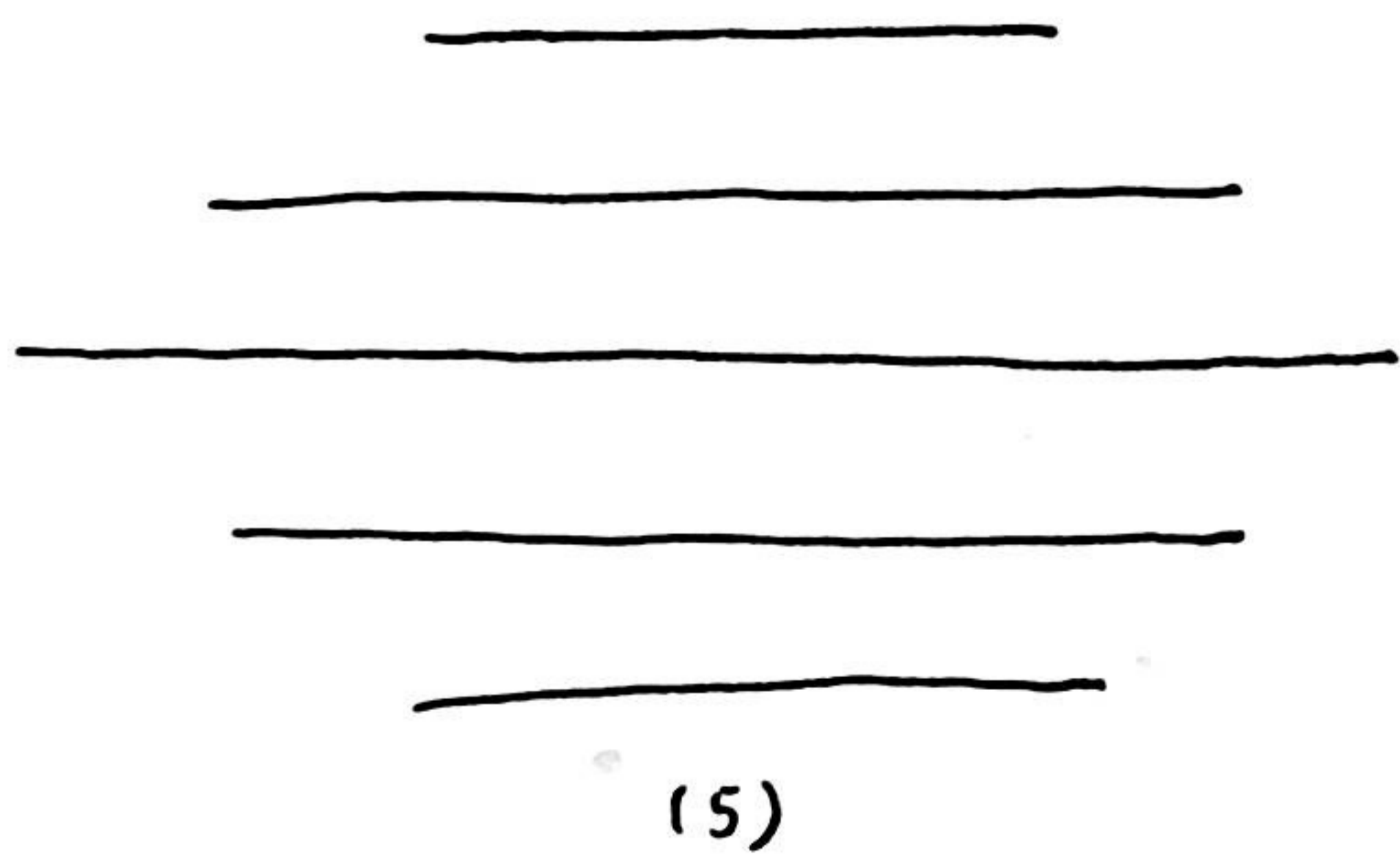
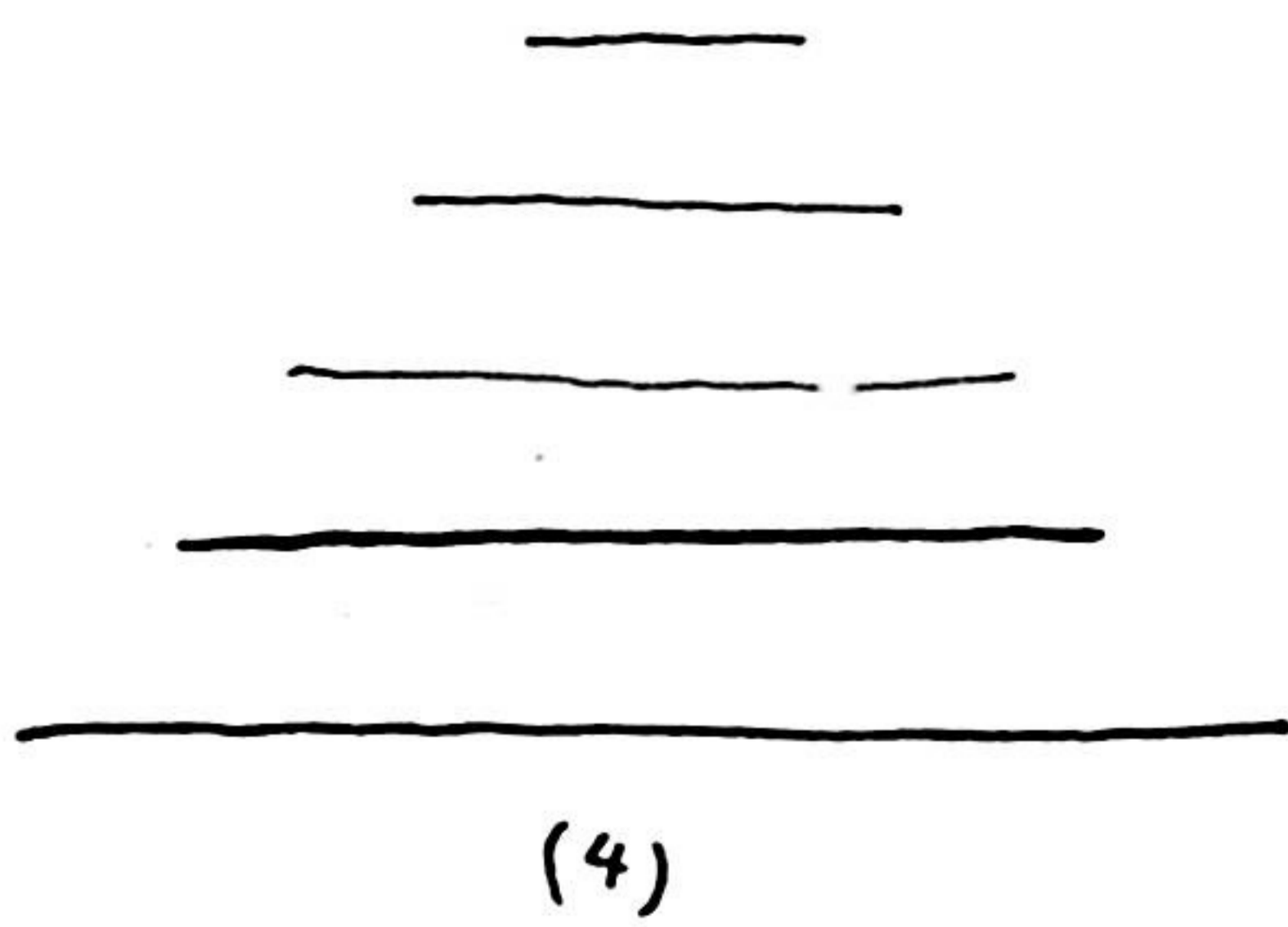
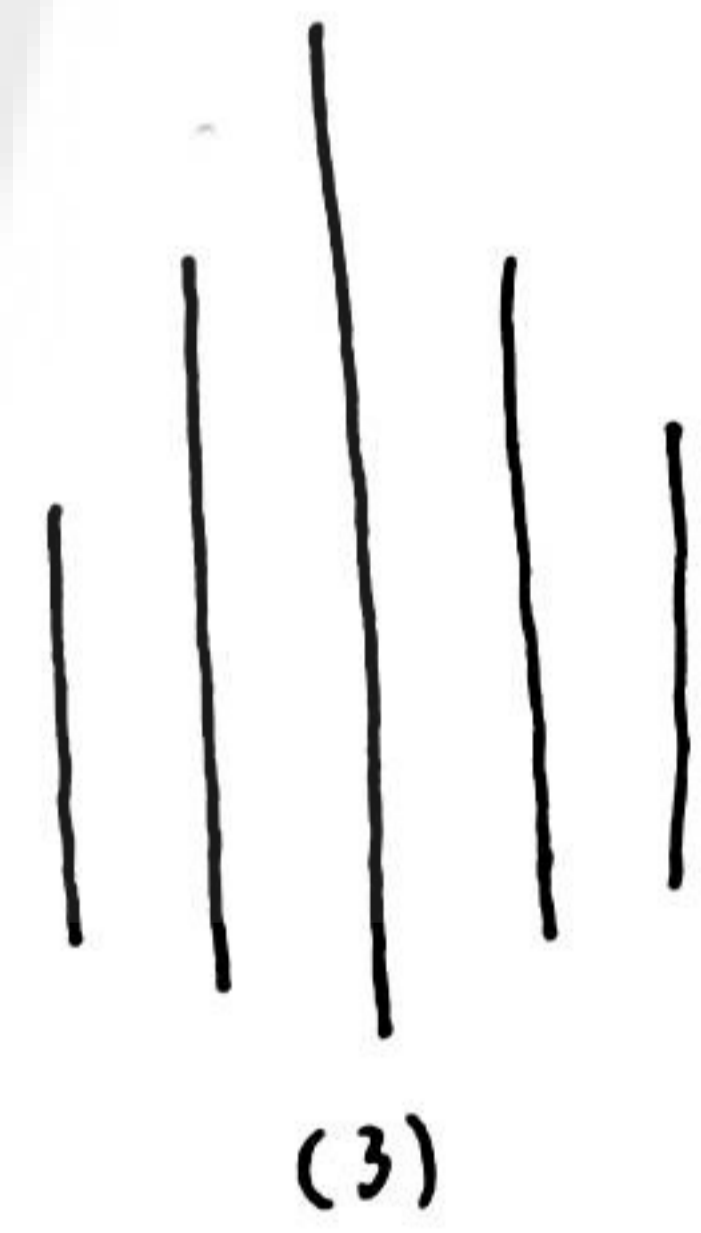
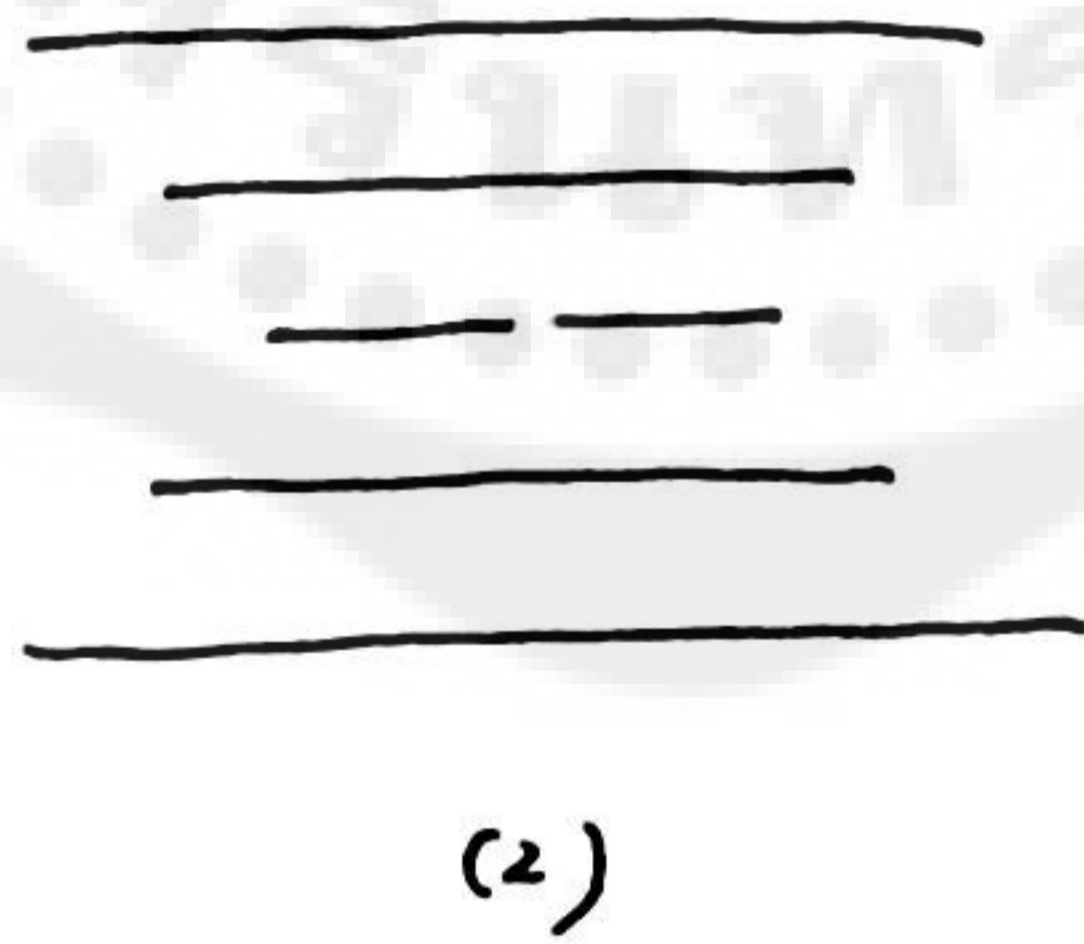
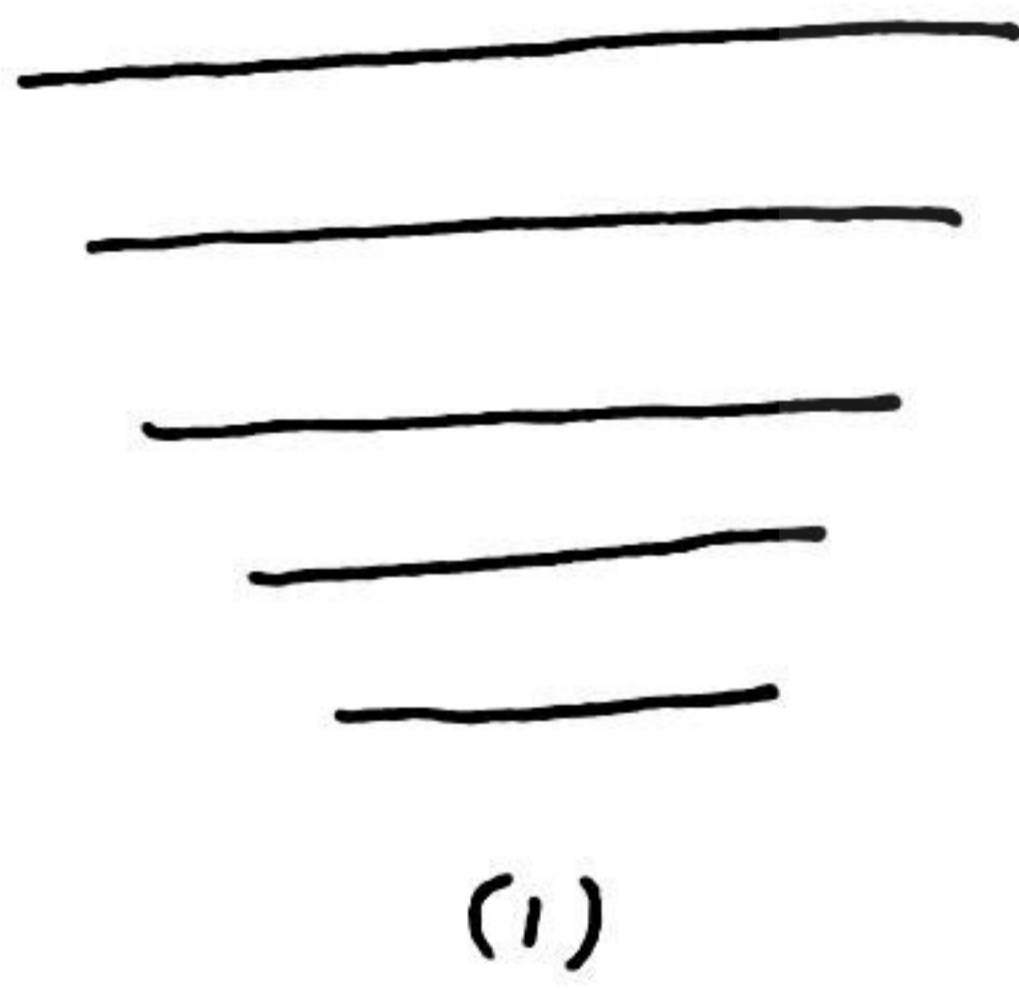
APPENDIX IX

Examples of the Arrangement of Five Lines.

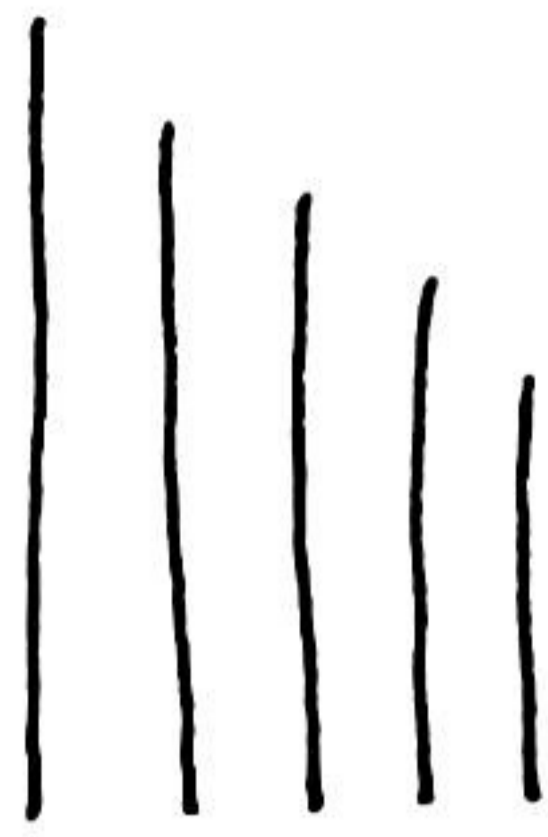
Type I



Type II



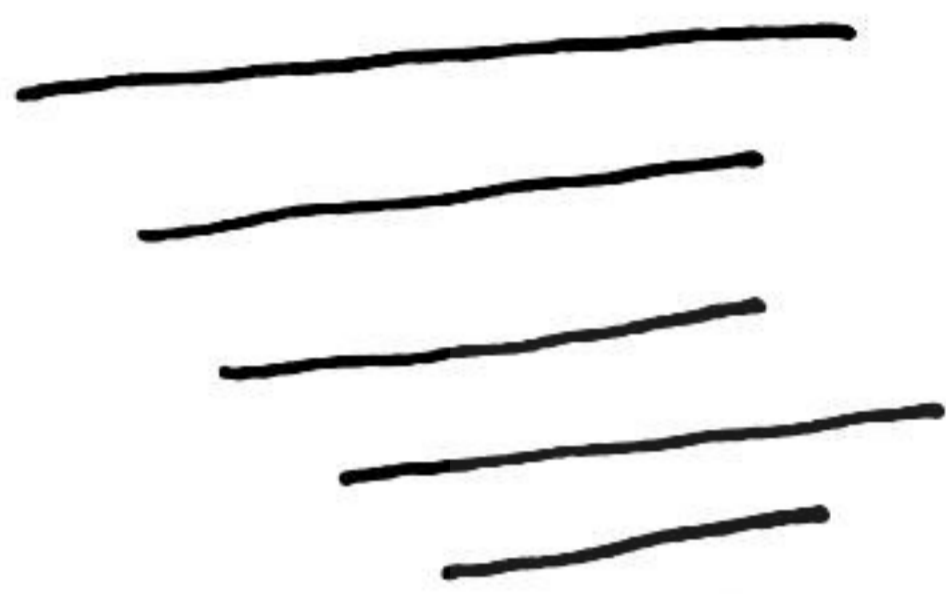
Type III



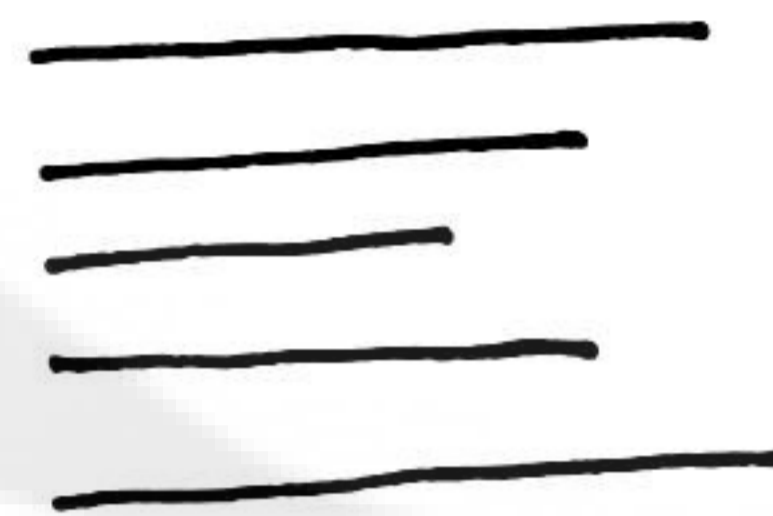
(1)



(2)

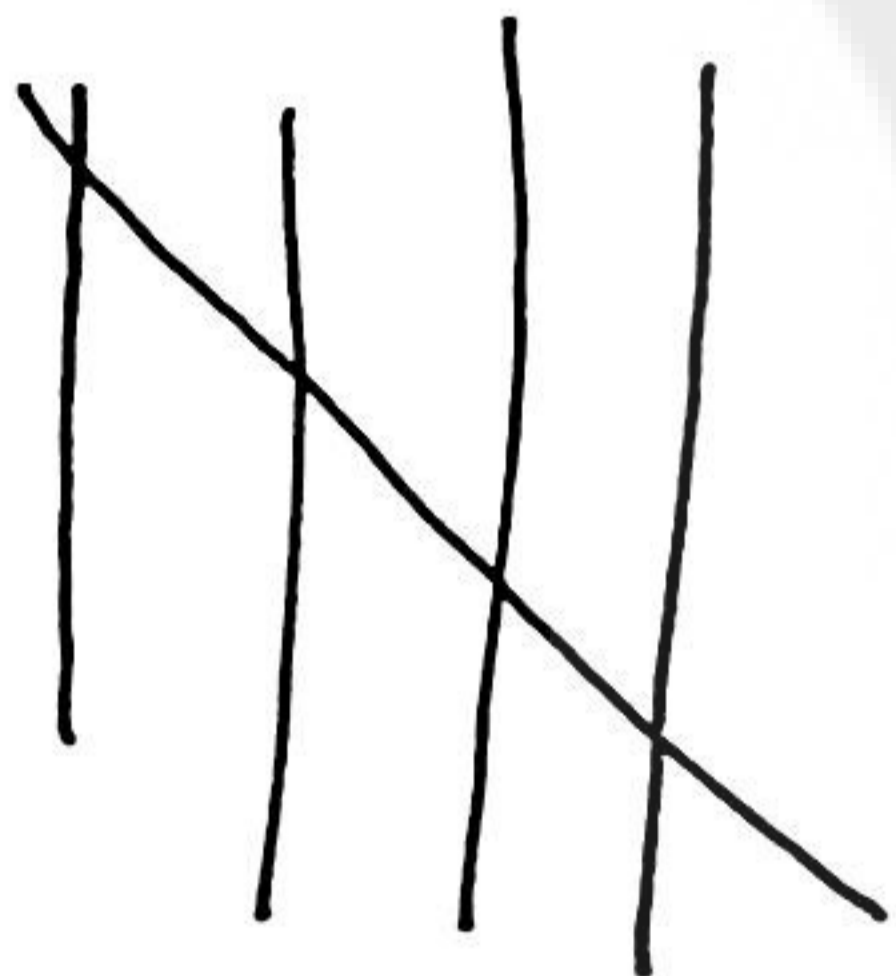


(3)

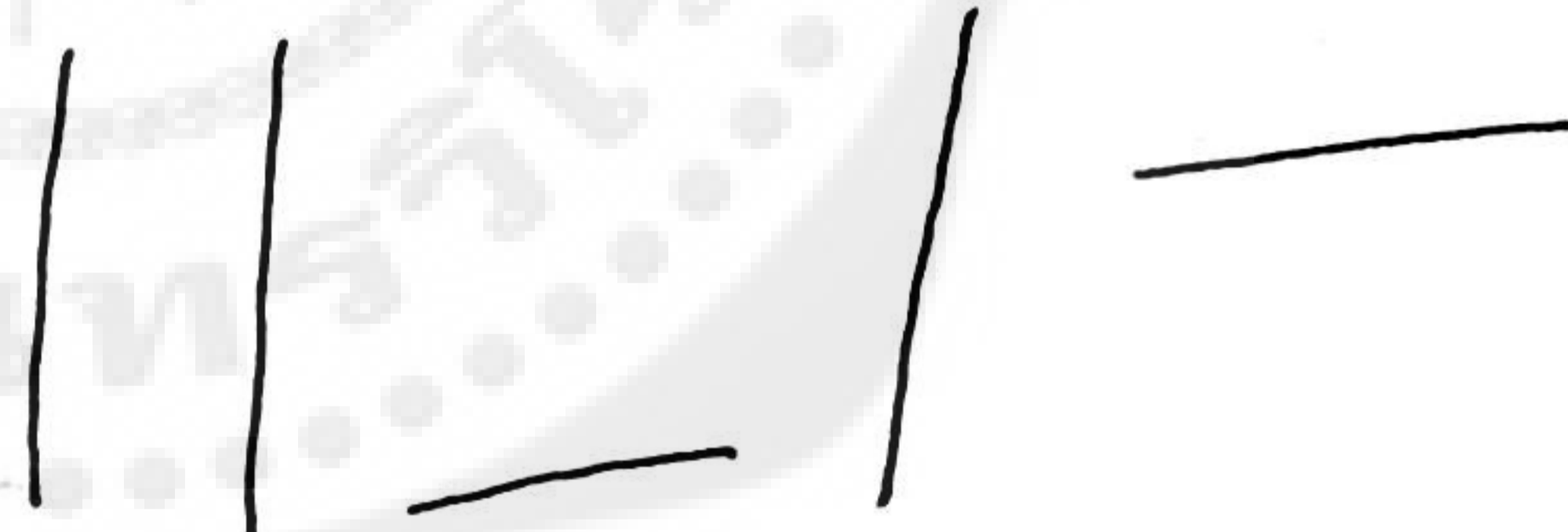


(4)

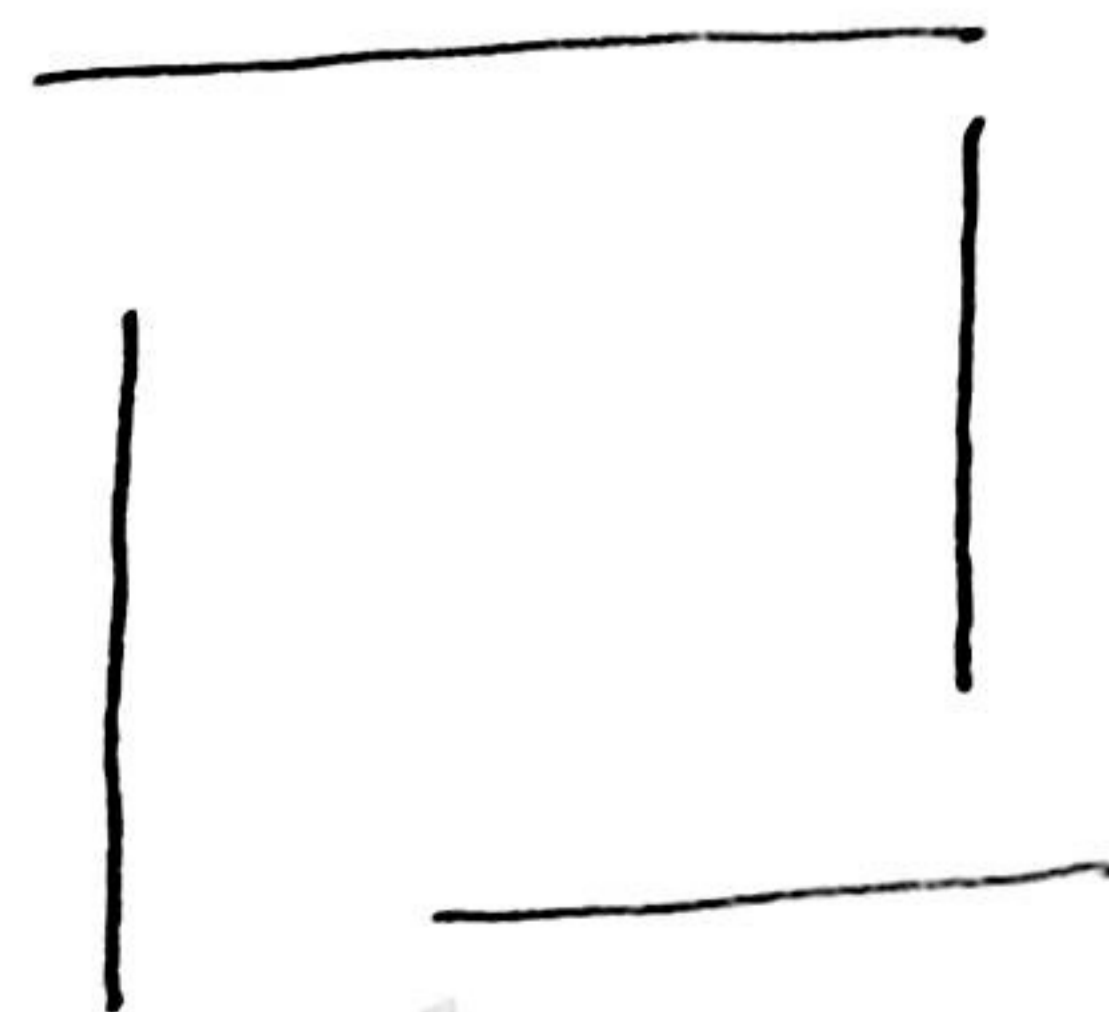
Type IV



(1)



(3)

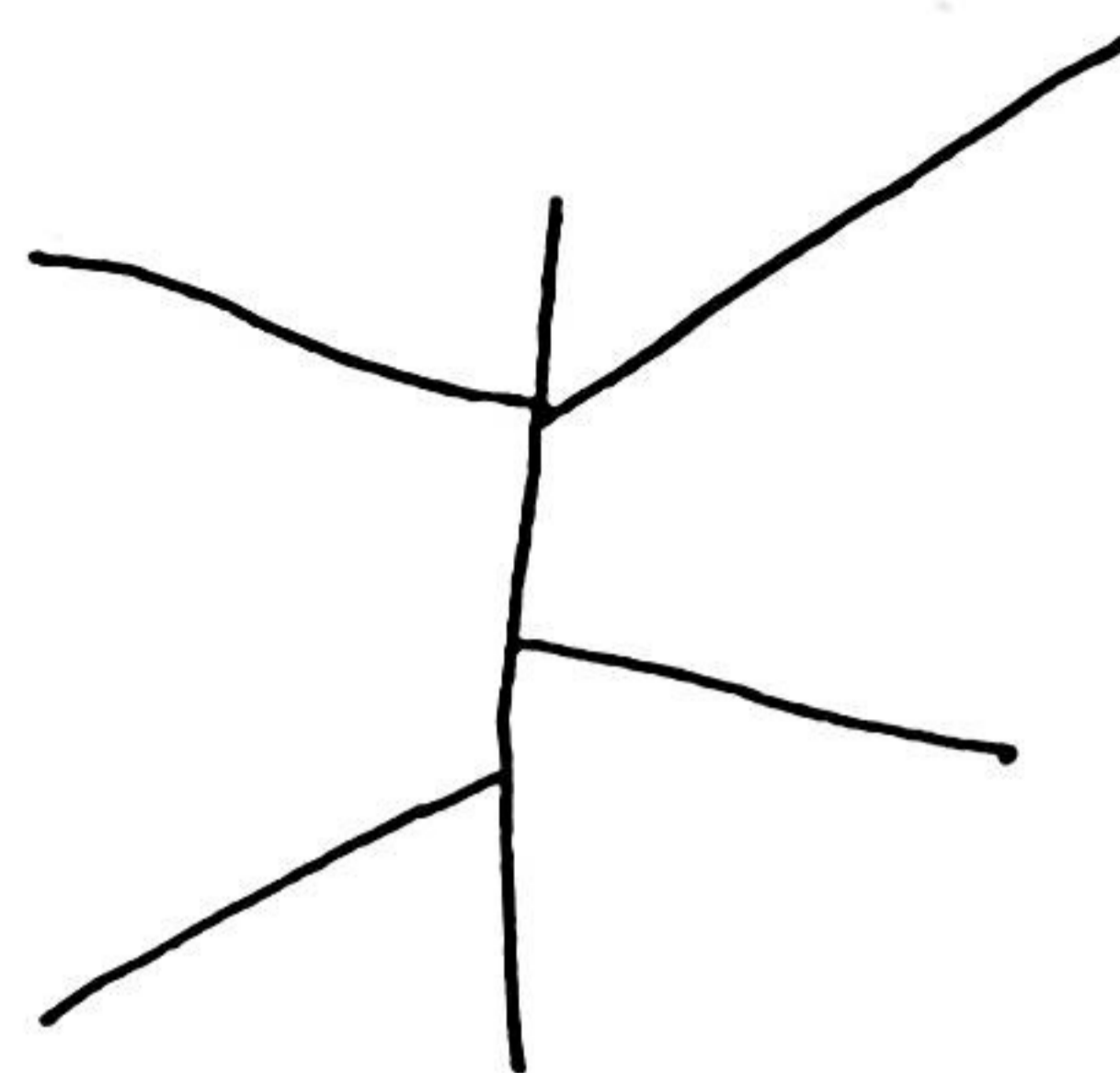


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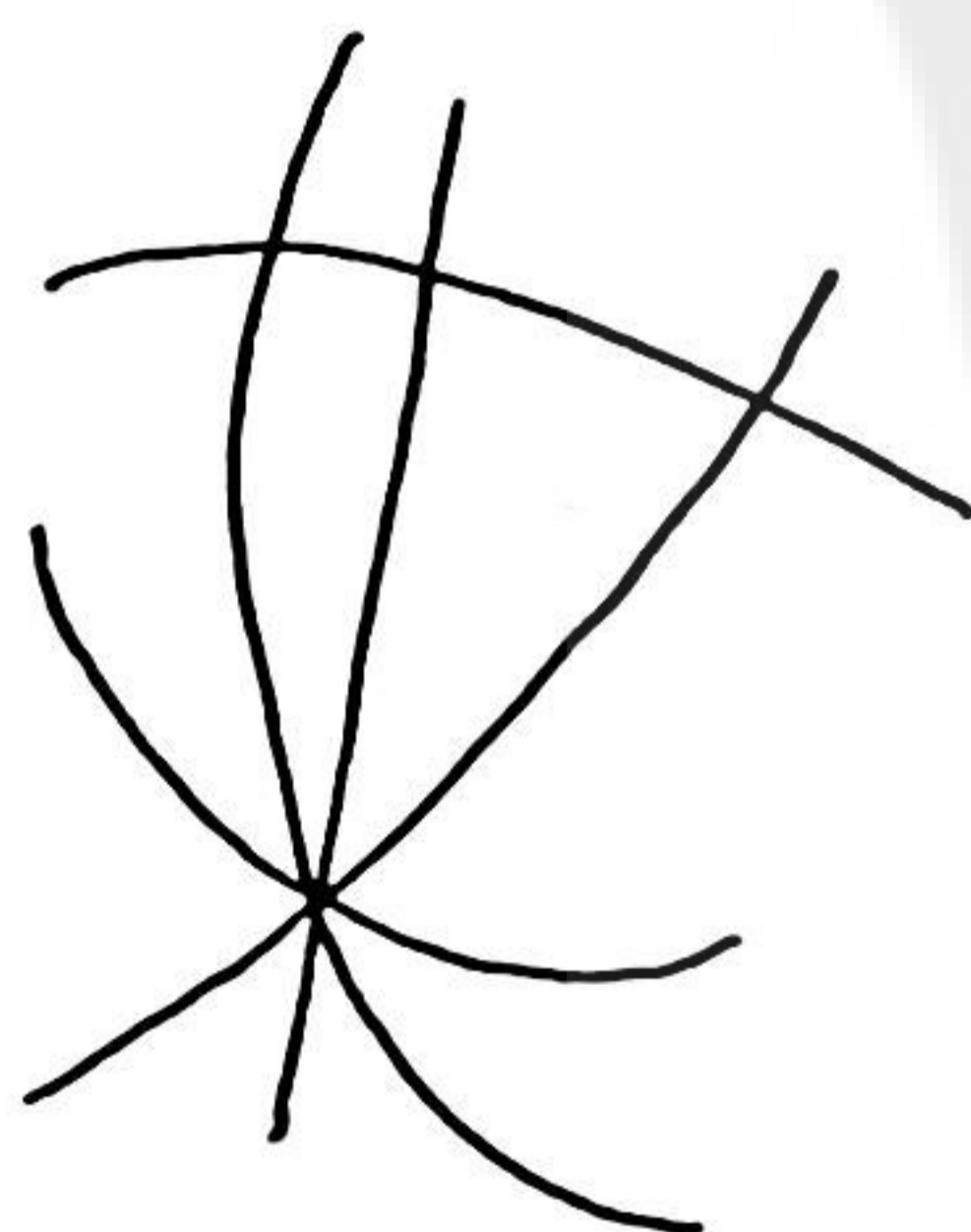
TYPE IV (continued)



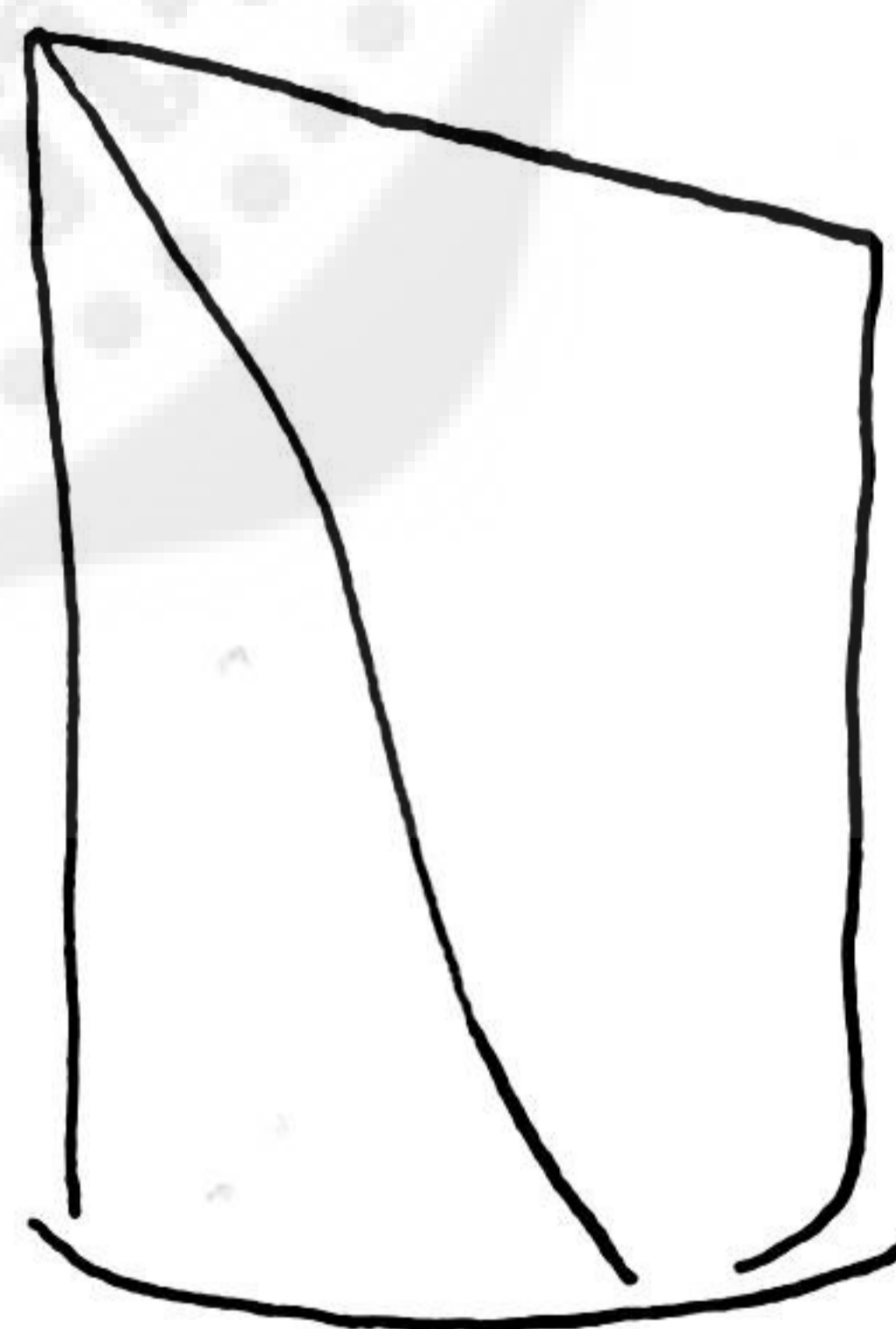
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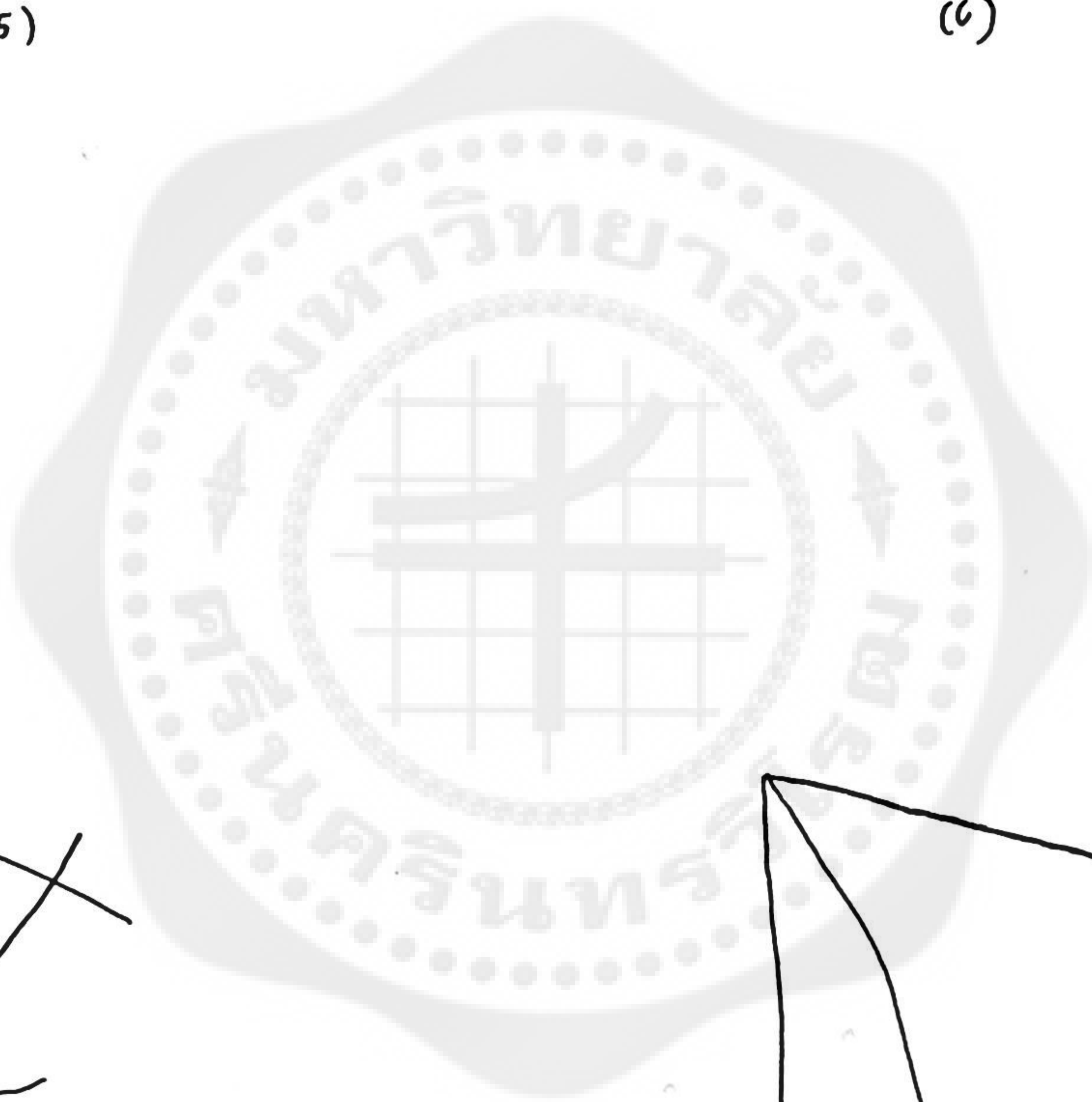
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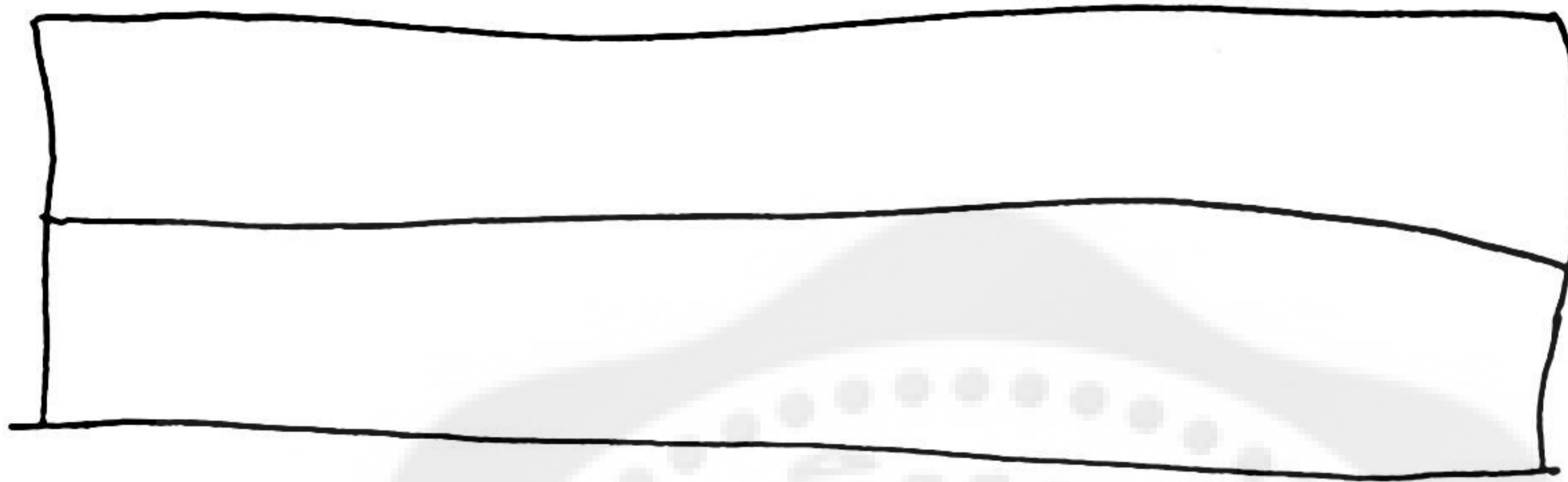


(7)

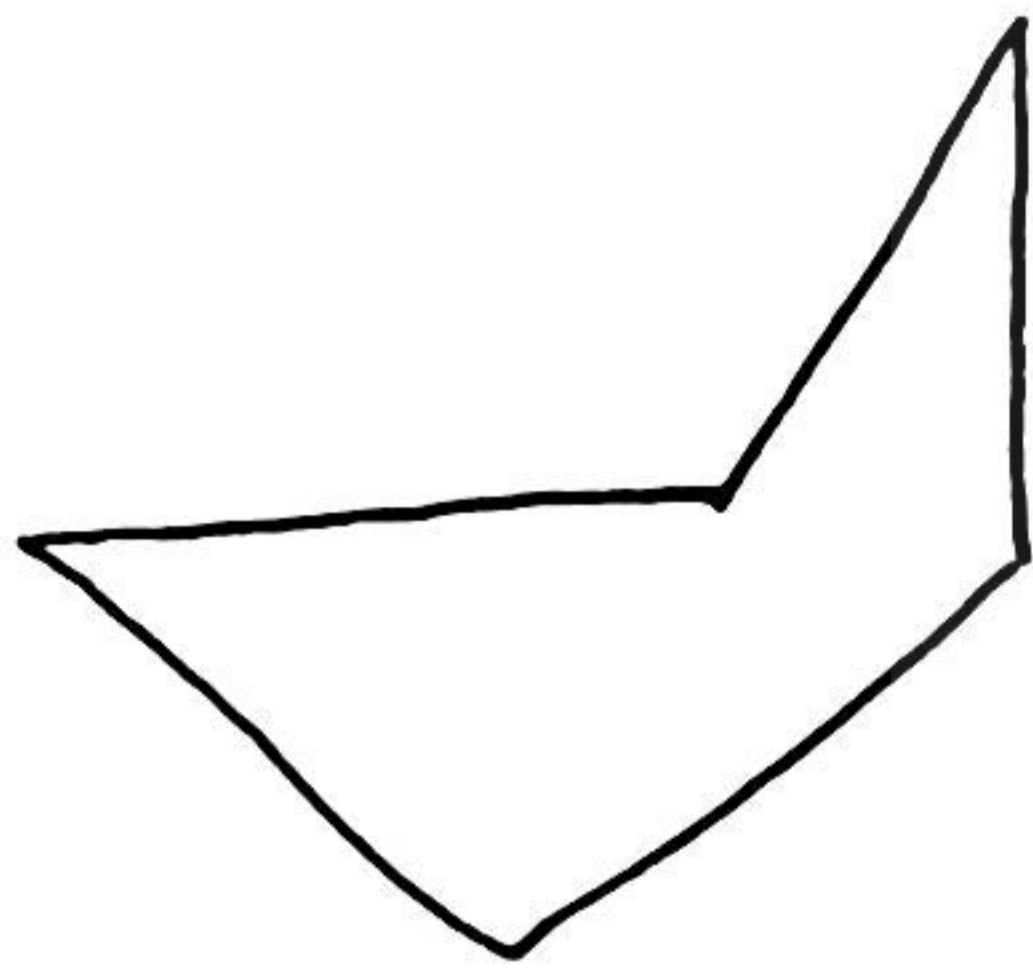


(8)

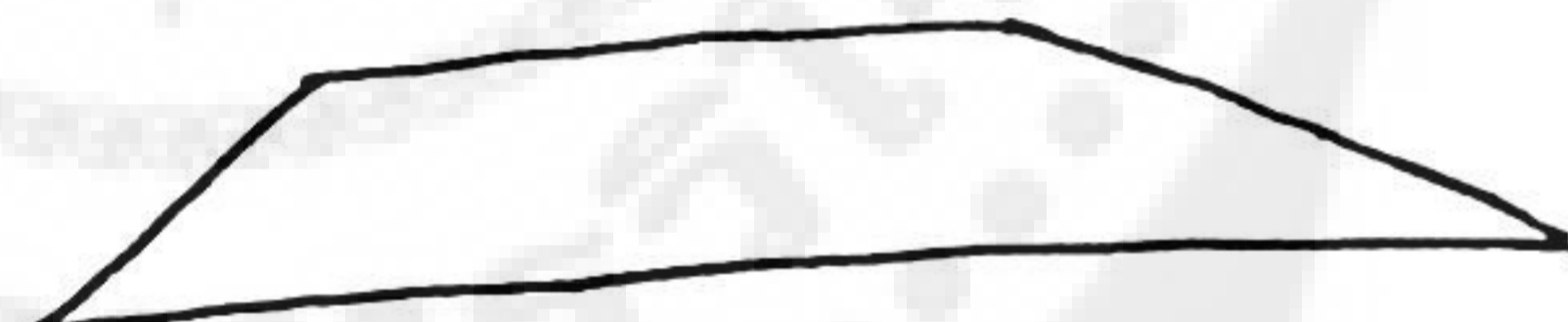


Type IV (continued)

(9)



(10)

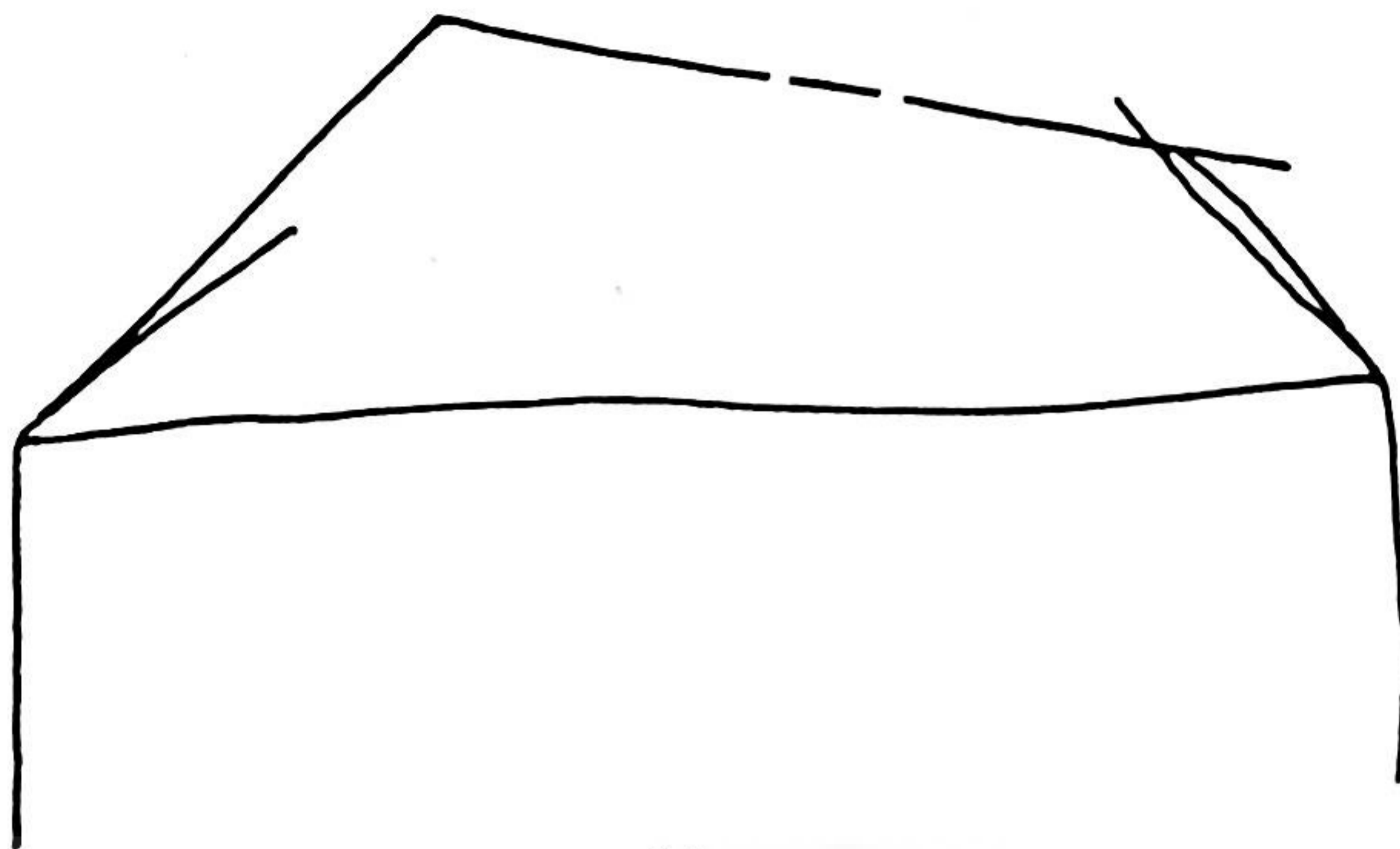


(11)

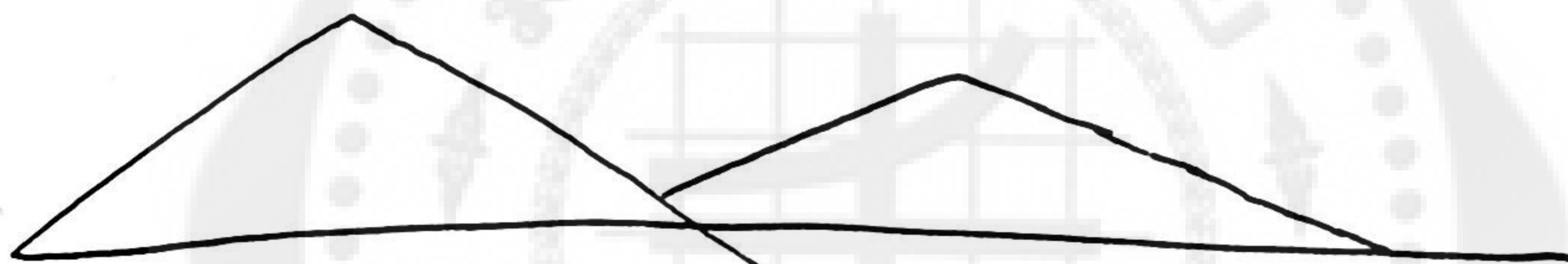
Type V

See Appendix V, every type of grouping signs that five lines play a role as frame.

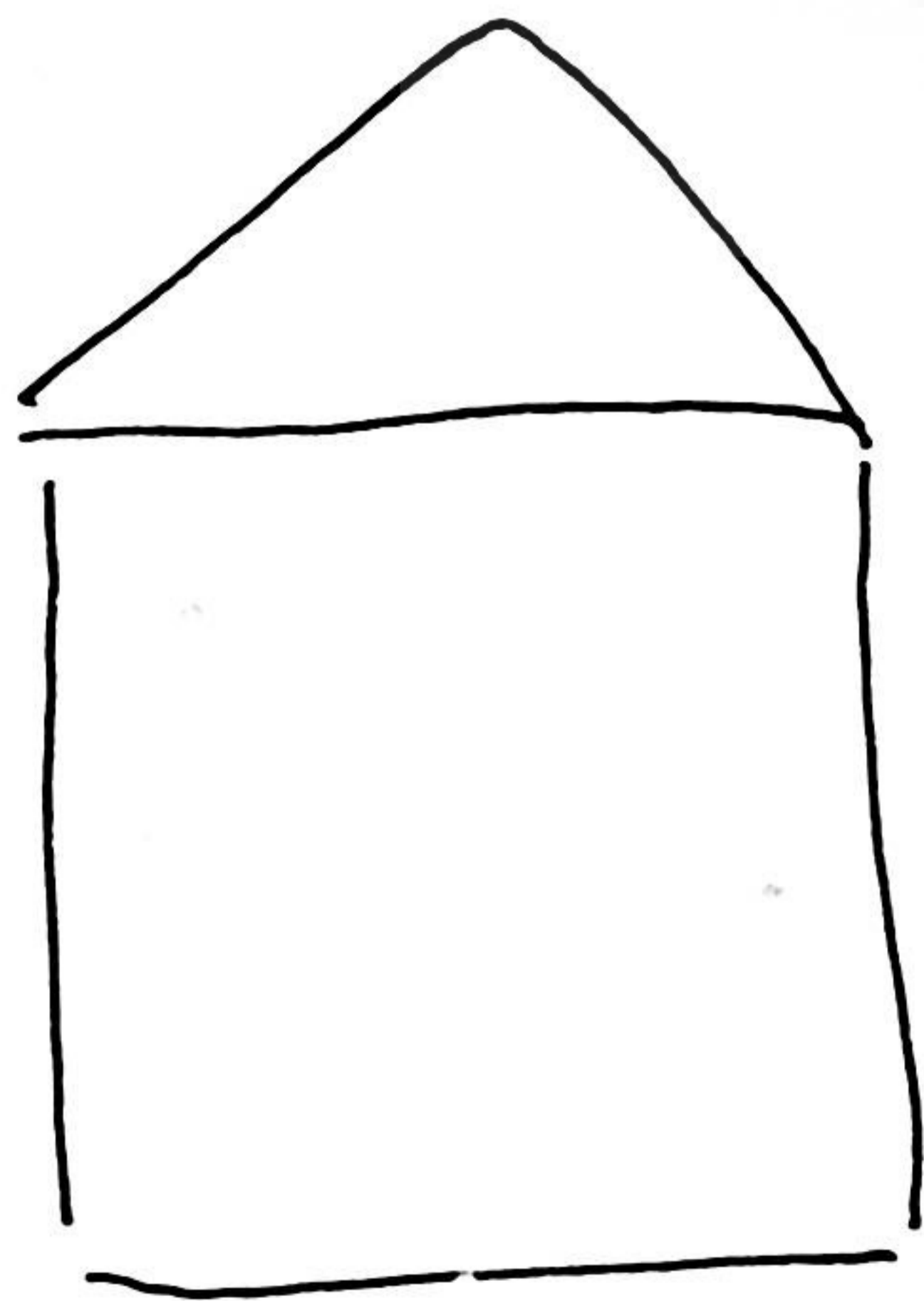
Type VI



(1)



(2)



(3)



(4)

APPENDIX X

Frequency Distributions of Different Types of the Arrangement
of Five Lines

X.1 First Sheets of the Nine Classes.

Type School and Grade	I	II	III	IV	V	VI	Total of S
Ala	33	1	0	0	6	0	40
Alb	29	2	0	3	0	0	34
D ₁	27	0	0	2	1	0	30
B ₂	23	1	2	7	2	0	35
C ₂	18	2	5	6	0	1	32
B ₃	20	2	3	6	1	0	32
C ₃	22	2	3	11	1	0	39
A ₄	29	3	2	4	4	2	44
D ₄	4	2	2	11	3	1	23

X.2 First Sheets of the Four Grades

Type Grade	I	II	III	IV	V	VI	Total of S
I	89	3		5	7		104
II	41	3	7	13	2	1	67
III	42	4	6	17	2		71
IV	33	5	4	15	7	3	67

X.3 First Sheets of the Six Age Groups

Type Age	I	II	III	IV	V	VI	Total of S
4/9 - 6/8	22	1		2	1		26
6/9 - 7/8	49	2	2	5	1	1	60
7/9 - 8/8	67	6	7	16	5		101
8/9 - 9/8	27	2	6	21	5	1	62
9/9 - 11/8	19	4	1	5	4	2	35
11/9 - 14/8	21		1	1	2		25

X.4 Memory Sheets of the Nine Classes

Type School and Grade	I	II	III	IV	V	VI	Total of S
A _{1a}	28	3	2		5		38
A _{1b}	26	1					27
D ₁	26			2			28
B ₂	18	3	3	6	1		31
C ₂	19	1	2	5			27
B ₃	22	1	2	5	1		31
C ₃	23	1	2	10	4		40
A ₄	28	6	1	3	2	3	43
D ₄	3	2	2	10	2	2	21

X.5 Memory Sheets of the Four Grades

Type Grade	I	II	III	IV	V	VI	Total of S
I	80	4	2	2	5		93
II	37	4	5	11	1		58
III	45	2	4	15	5		71
IV	31	8	3	13	4	5	64

X.6 Memory Sheets of the Six Age Groups

Type Age	I	II	III	IV	V	VI	Total of S
4/9 - 6/8	20		1	2			23
6/9 - 7/8	47	1	1	3	2		54
7/9 - 8/8	63	5	7	13	4		92
8/9 - 9/8	25	5	4	18	6	2	60
9/9 - 11/8	20	5	1	4	2	2	34
11/9 - 14/8	18	2		1	1	1	23

APPENDIX XI

THE USE OF SPACE

Frequency Distributions of Different Uses of Space.

XI.1 The Nine Classes

(First Sheets)

Type School and Grade	I Whole	II Centre	III Half	IV Quarter	Total of S
A _{1a}	22	6	13		41
A _{1b}	5	4	11	14	34
D ₁	26	1	2	1	30
B ₂	14	2	12	7	35
C ₂	18	6	6	2	32
B ₃	17	2	6	7	32
C ₃	13	7	16	5	41
A ₄	14	5	22	3	44
D ₄	6	6	7	4	23

XI.2 The Four Grades

(First Sheets)

Type Grade	I	II	III	IV	Total of S
I	53	11	26	15	105
II	32	8	18	9	67
III	30	9	22	12	73
IV	20	11	29	7	67

XI.3 The Six Age Groups

(First Sheets)

Type Age	I	II	III	IV	Total of S
4/9 - 6/8	18	3	5	1	27
6/9 - 7/8	33	4	15	8	60
7/9 - 8/8	43	14	26	19	102
8/9 - 9/8	22	9	24	8	63
9/9 - 11/8	10	6	13	6	35
11/9 - 14/8	9	3	12	1	25

XI.4 The Nine Classes

(Memory Sheets)

Type School and Grade	I	II	III	IV	Total of S
A _{1a}	12	8	13	4	42
A _{1b}		4	3	27	34
D ₁	17	1	10	2	30
B ₂	4	5	14	9	32
C ₂	16	3	9	4	32
B ₃	10	4	10	8	32
C ₃	10	6	16	9	41
A ₄	9	10	17	8	44
D ₄	5	3	11	4	23

XI.5 The Four Grades
(Memory Sheets)

Type Grade	I	II	III	IV	Total of S
I	29	13	31	33	106
II	20	8	23	13	64
III	20	10	26	17	73
IV	14	13	28	12	67

XI.6 The Six Age Groups
(Memory Sheets)

Type Age	I	II	III	IV	Total of S
4/9 - 6/8	12		10	5	27
6/9 - 7/8	15	10	17	16	58
7/9 - 8/8	23	14	35	30	102
8/9 - 8/8	20	9	22	12	63
9/9 - 11/8	5	5	16	9	35
11/9 - 14/8	8	6	8	3	25

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