

# Primary, Concrete, Abstract, Formal, Systematic, and Metasystematic Balance Beam Problems. 1995 Pilot Versions

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For Educational Purposes  
3c-6

## Consent Form

I, the undersigned, understand that the basic intent of these tasks is to understand reasoning and how it develops. This is entirely voluntary and I may stop at any time. I understand that the information I have given regarding my personal history, as well as the responses I give to the tasks, will be kept strictly confidential. I understand that my identity and personal history will not be divulged in any discussion, student report, lecture, address, or publication derived from this project.

\_\_\_\_\_  
Signature

\_\_\_\_\_|\_\_\_\_\_|\_\_\_\_\_  
Month Day Year

## Instructions

Please answer all parts of this questionnaire. Read each section and answer the questions in the order given. Do not go to the following section before you have finished the previous section. Remember this is not a test of your ability as an individual. Rather, we wish to know how adults, in general, reason about the issues presented here. The order of answering is essential to this study about adult reasoning.

What is most important is not only *what* you consider to be good, but the *reasons* for your choices. Therefore, it is essential that you state *your reasons why* you make the choices that you make.

47:14;05-08-95-20 (Saturday, August 5, 1995; 2:47pm)  
46:09;02-08-95-20 (Wednesday, August 2, 1995; 9:46am)  
58:23;27-07-95-20 (Thursday, July 27, 1995; 11:58pm)  
53:12;27-07-95-20 (Thursday, July 27, 1995; 12:53pm)  
14:28;24-05-95-20 (Wednesday, May 24, 1995; 2:28pm)  
29:18;20-02-95-20 (Monday, February 20, 1995; 6:29pm)  
19:15;13-07-94-20 (Wednesday, July 13, 1994; 3:20pm)  
21:35;02-20-86-20 (Thursday, February 20, 1986)

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## Primary, Concrete, Abstract, Formal, Systematic, and Metasystematic Balance Beam Problems

Date of Birth:      Month                      Day                      Year				Subject Number
Place of Birth: _____ City                      Country or State		Place of Residence: _____ City                      Country or State		_____ Last four digits of Social Security Number
Sex:    M            F	Zip code: _____		Age: _____	Religion:
If married:      1st    2nd                      3rd    4th                      marriage				
If not married:      Single                      Divorced                      Spouse deceased				Domestic partner
Child in family:      1st    2nd                      3rd    4th                      Other _____				
# Sisters	Father's occupation:	Mother's occupation:	Spouse's occupation:	Your occupation:
# Brothers				
	Father's education:	Mother's education:	Spouse's education:	Your previous occupation:

Your	Years in school	Major/Minor	Year graduated	Degree earned
Grade school				
High School				
College				
Graduate School				

\_\_\_\_\_  
Month/Day/Year

\_\_\_\_\_  
Experimenter Name

\_\_\_\_\_  
Experimenter Telephone

Methods of administration:

- Mailed to subject who wrote answers  
 Handed out to subject who wrote answers  
 Subject wrote answers while experimenter was present  
 Subject wrote answers and responded to experimenter probes

- Subject wrote answers while experimenter probed and taped  
 Experimenter wrote answers  
 Experimenter wrote answers and probed  
 Experimenter taped and probed for answers

**Task P1**

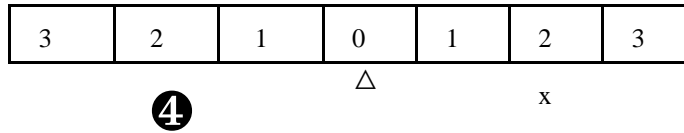
This is a balance beam.

M The numbers in the circles below the beam are the weights.

M The numbers to the left and right of the balance point (fulcrum,  $\Delta$ ) are the distances:

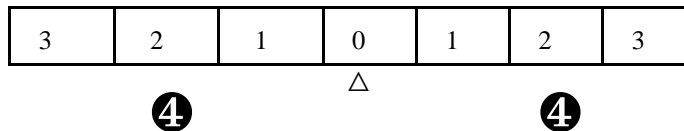
M The value  $x$  is the amount of weight needed to balance the beam. In the example, the amount needed is 4.

Example



M What number makes the beam balance?

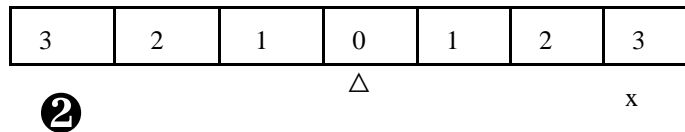
Solution



M What weight will make the beam balance? That weight goes at the question mark.

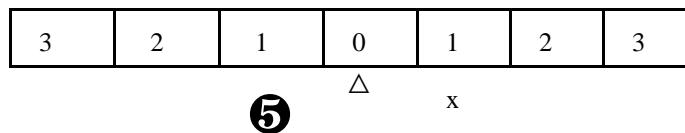
Circle the correct answer below:

1.



- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7

2.



- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7

3.

3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\Delta$

x

**6**

- |      |      |
|------|------|
| a. 0 | e. 4 |
| b. 1 | f. 5 |
| c. 2 | g. 6 |
| d. 3 | h. 7 |

4.

3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\Delta$

x

**7**

- |      |      |
|------|------|
| a. 0 | e. 4 |
| b. 1 | f. 5 |
| c. 2 | g. 6 |
| d. 3 | h. 7 |

5.

3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\Delta$

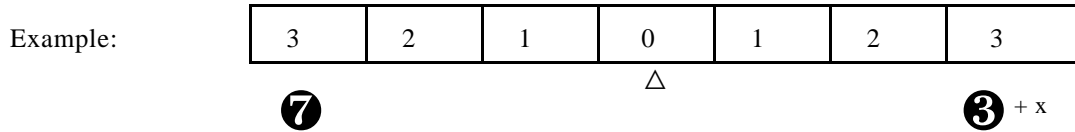
x

**6**

- |      |      |
|------|------|
| a. 0 | e. 4 |
| b. 1 | f. 5 |
| c. 2 | g. 6 |
| d. 3 | h. 7 |

**Task C1**

Choose the number which balances the balance beam:

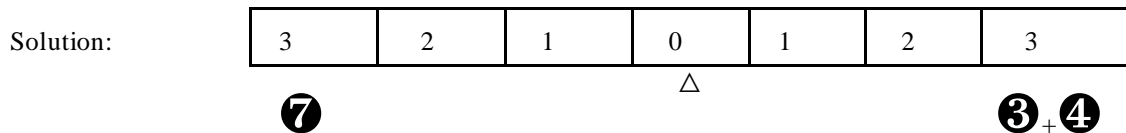


M The numbers in the circles below the beam are the weights.

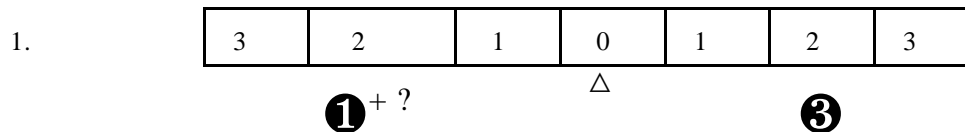
M The numbers to the left and right of the balance point (fulcrum,  $\Delta$ ) are the distances:

M The value x is the amount of weight needed to balance the beam. In the example, the amount needed is 4.

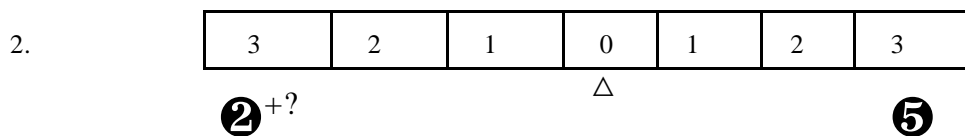
M What size weight will make the beam balance? That weight goes at the question mark.



Circle the number that will make the beam balance:



- a. 0            e. 4            .
- b. 1            f. 5
- c. 2            g. 6
- d. 3            h. 7



- a. 0            e. 4            .
- b. 1            f. 5
- c. 2            g. 6
- d. 3            h. 7

3.

3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\textcircled{3}^{+?}$   $\Delta$   $\textcircled{4}$

- |      |      |   |
|------|------|---|
| a. 0 | e. 4 | . |
| b. 1 | f. 5 |   |
| c. 2 | g. 6 |   |
| d. 3 | h. 7 |   |

4.

3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\textcircled{4}$   $\Delta$   $\textcircled{2}^{+?}$

- |      |      |   |
|------|------|---|
| a. 0 | e. 4 | . |
| b. 1 | f. 5 |   |
| c. 2 | g. 6 |   |
| d. 3 | h. 7 |   |

5.

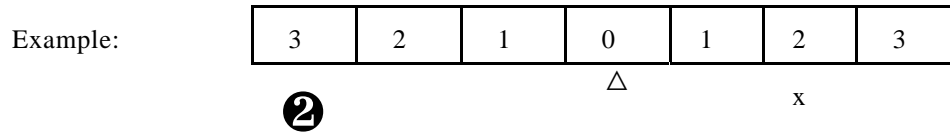
3	2	1	0	1	2	3
---	---	---	---	---	---	---

$\textcircled{6}$   $\Delta$   $\textcircled{3}^{+?}$

- |      |      |   |
|------|------|---|
| a. 0 | e. 4 | . |
| b. 1 | f. 5 |   |
| c. 2 | g. 6 |   |
| d. 3 | h. 7 |   |

**Task A1**

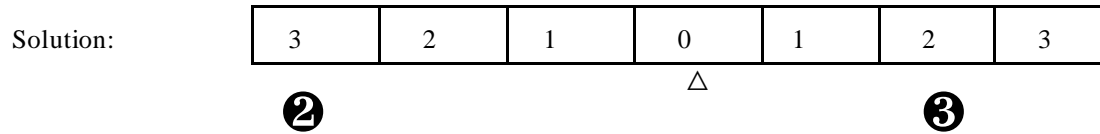
M What number makes the beam balance?



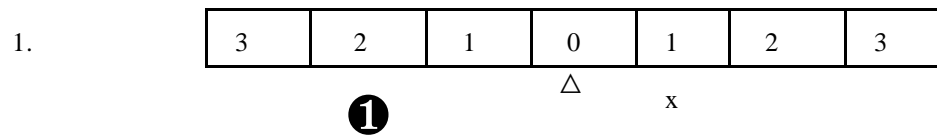
M The numbers in the circles below the beam are the weights.

M The numbers to the left and right of the balance point (fulcrum,  $\Delta$ ) are the distances:

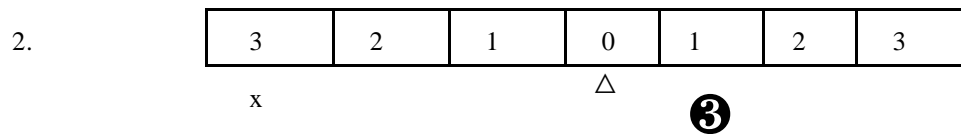
M The value  $x$  is the amount of weight needed to balance the beam. In the example, the amount needed is 3.



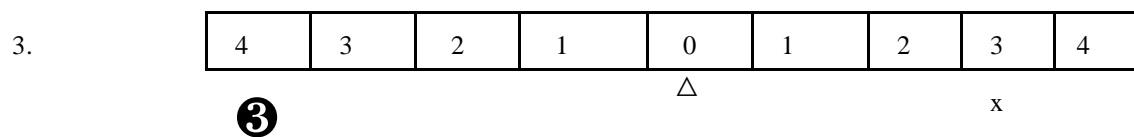
Circle the correct answer:



- a. 0      e. 4      .
- b. 1      f. 5
- c. 2      g. 6
- d. 3      h. 7



- a. 0      e. 4      .
- b. 1      f. 5
- c. 2      g. 6
- d. 3      h. 7



- a. 0      e. 4      .
- b. 1      f. 5
- c. 2      g. 6
- d. 3      h. 7

4.

4	3	2	1	0	1	2	3	4
---	---	---	---	---	---	---	---	---

 $\Delta$ 

x

**2**

- a. 0            e. 4            .  
 b. 1            f. 5  
 c. 2            g. 6  
 d. 3            h. 7

5.

5	4	3	2	1	0	1	2	3	4	5
---	---	---	---	---	---	---	---	---	---	---

 $\Delta$ 

y

x

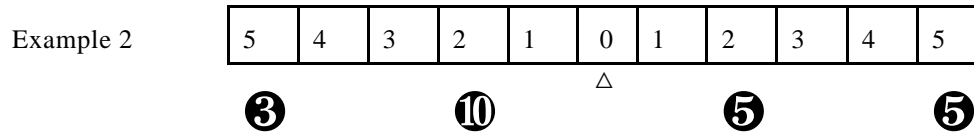
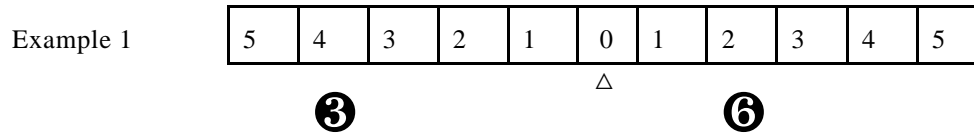
y= **4**

- a. 0            e. 4            .  
 b. 1            f. 5  
 c. 2            g. 6  
 d. 3            h. 7



**Task F1**

The diagrams below represent balance beams in a state of balance:

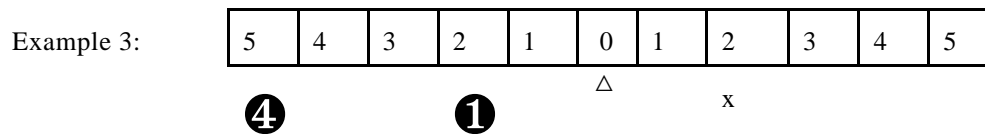


M The numbers in the circles below the beam are the weights.

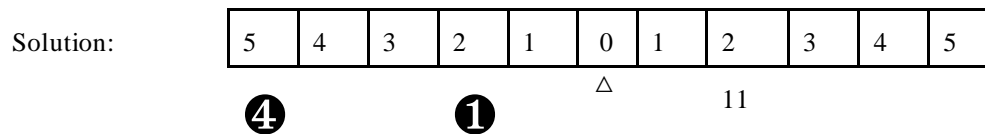
M The numbers to the left and right of the balance point (fulcrum,  $\Delta$ ) are the distances:

M The value  $x$  is the amount of weight needed to balance the beam. In the example, the amount needed is 4.

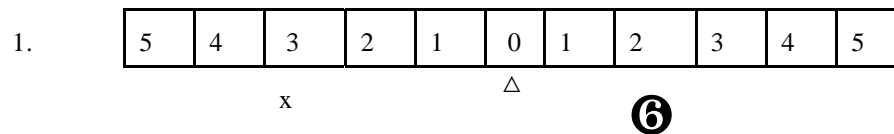
In a typical problem, you will be asked to solve for the unknown value,  $x$ :



The unknown value is 11:

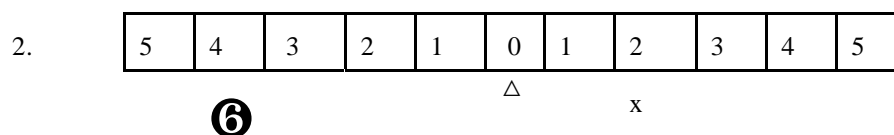


In problems 1-3, solve for the unknown weight,  $x$ :



The unknown weight  $x$  is equal to

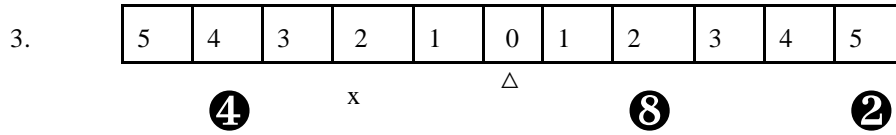
- |      |       |
|------|-------|
| a. 3 | e. 7  |
| b. 4 | f. 8  |
| c. 5 | g. 9  |
| d. 6 | h. 12 |



The unknown weight  $x$  is equal to

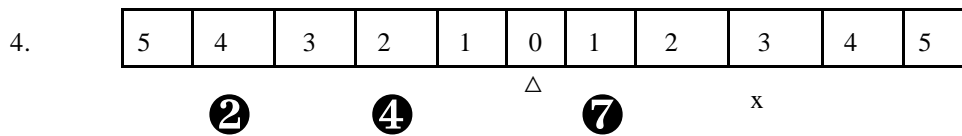
- |      |      |
|------|------|
| a. 3 | e. 7 |
|------|------|

- b. 4      f. 8
- c. 5      g. 9
- d. 6      h. 12



The unknown weight x is equal to

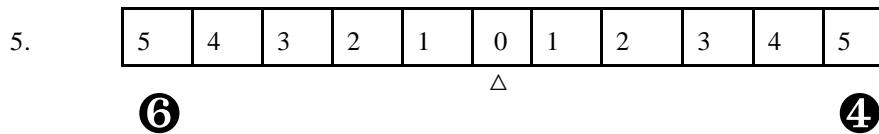
- a. 2      e. 12
- b. 3      f. 14
- c. 5      g. 15
- d. 10     h. 21



The unknown weight x is equal to

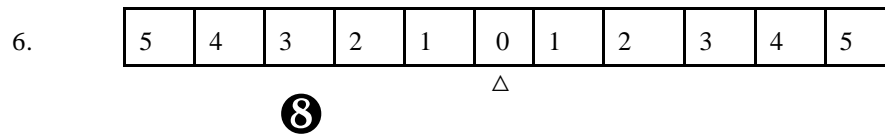
- a. 1      e. 8
- b. 3      f. 9
- c. 5      g. 16
- d. 6      h. 21

Beams 4 and 5 are not now in balance. You are given a specific amount of additional weight. You must determine the place where the additional weight is to be hung from the balance beam so that the balance beam balances. This place is described by its distance to the left or right of 0.



The additional weight is: **5** Place the weight:

- a. 1 units to the left of 0.
- b. 2 units to the left of 0.
- c. 3 units to the left of 0.
- d. 4 units to the left of 0.
- e. 1 unit to the right of 0.
- f. 2 units to the right of 0.
- g. 3 units to the right of 0.
- h. 4 units to the right of 0.



The additional weight is **6**. Place the weight

- a. 1 units to the left of 0.
- b. 2 units to the left of 0.
- c. 3 units to the left of 0.
- d. 4 units to the left of 0.
- e. 2 unit to the right of 0.
- f. 3 units to the right of 0.
- g. 4 units to the right of 0.
- h. 5 units to the right of 0.

**Task F2**

Once upon a time there was this strange school on another planet. There could even be negative numbers of students. The school used a very strange method for balancing the number of strong and weak students in a class.

M All the students were rated on a scale of -100 to 100 (negative one hundred to positive one hundred).

M The average rating of the students was always maintained at 0 in each class.

M When the class average was not 0, the balance between strong and weak students was upset. Then, the principal added new students so the class average was 0 again.

Sample Problem:

- . In one class, two students each received a rating of 4. How many students had to receive a rating of -8 in order to maintain the 0 average?

<b>Ratings</b>	-8	4
<b>Number of Students</b>	?	2

Solution:

Only one student had to receive a rating of -8 in order to maintain the 0 average.

<b>Ratings</b>	-8	4
<b>Number of Students</b>	1	2

Circle the correct answer:

1. In one class, two students each received a rating of 26. How many students had to receive a rating of -13 in order to maintain the 0 average?

<b>Ratings</b>	-13	26
<b>Number of Students</b>	?	2

- a. -13      e. 4  
 b. -4        f. 13  
 c. -2        g. 26  
 d. 2         h. 28

2. In one class, two students each received a rating of -15. How many students had to receive a rating of 6 in order to maintain the 0 average?

<b>Ratings</b>	-15	6
<b>Number of Students</b>	2	?

- a. -5            e. 8  
 b. 3             f. 12  
 c. 5             g. 13  
 d. 7             h. 15

3. In another class, the teacher gave 8 students a rating of 11 and 12 students a rating of -4. What rating would 8 more students have to receive in order for the average rating to remain at 0?

<b>Ratings</b>	?	-4	11
<b>Number of Students</b>	8	12	8

- a. -5            e. 8  
 b. 2             f. 11  
 c. 5             g. 12  
 d. 7             h. 39

4. In yet another class, the teacher gave 3 students a rating of 6 and 4 students a rating of 12. How many students had to receive a rating of -6 in order for the average rating to be equal to 0?

<b>Ratings</b>	-6	6	12
<b>Number of Students</b>	?	3	4

- a. 1              e. 7  
 b. 3              f. 11  
 c. 5              g.  $11\frac{1}{4}$   
 d. 6              h. 42

5. In yet another class, the teacher gave 4 students a rating of 7, 5 students a rating of 3, and 10 students a rating of -5. An unknown number of students joined the class, each with a rating of 1. How many students would have had to join the class in order for the average rating to be 0?

<b>Ratings</b>	-5	1	3	7
<b>Number of Students</b>	10	?	5	4

- a. -10          e. 13  
 b. -2          f. 14  
 c. 3            g. 15  
 d. 7            h. 70

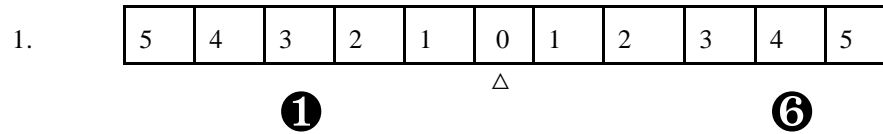


### Task S2 Fulcrum Task

The following balance beam is not balanced. Move the point of balance ( $\Delta$ ) so that it is balanced.

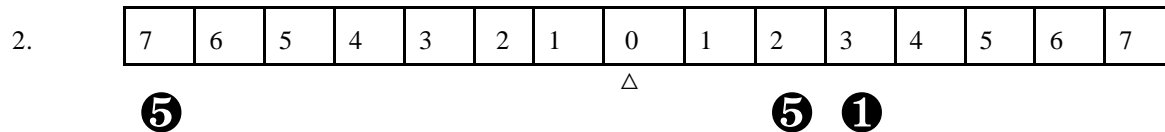
M You may not move the weights or change their value.

M **HINT:** The distances between the weights remain fixed.  
These distances are shown on the beams below.



Move the center of balance ( $\Delta$ )

- |                         |                          |
|-------------------------|--------------------------|
| a. 1 units to the left. | e. 1 unit to the right.  |
| b. 2 units to the left. | f. 2 units to the right. |
| c. 3 units to the left. | g. 3 units to the right. |
| d. 4 units to the left. | h. 4 units to the right. |



Move the center of balance ( $\Delta$ )

- |                         |                          |
|-------------------------|--------------------------|
| a. 1 units to the left. | e. 1 unit to the right.  |
| b. 2 units to the left. | f. 2 units to the right. |
| c. 3 units to the left. | g. 3 units to the right. |
| d. 4 units to the left. | h. 4 units to the right. |

**Task S3**

1. In the same school on the other planet, one teacher taught only two classes: A morning class and an afternoon class. She rated each student on a scale of -100 to 100. The class average was 0 for both classes. These are her rosters. What are the two unknown ratings,  $x$  and  $y$ ?

Morning class

<b>Ratings</b>	$x$	$y$	-3
<b>Number of Students</b>	2	3	1

Afternoon class

<b>Ratings</b>	$x$	$y$	1
<b>Number of Students</b>	1	2	-1

The unknown rating  $x$  is equal to:

- a. -5
- b. 3
- c. 5
- d. 7
- e. 8
- f. 9
- g. 12
- h. 15

The unknown rating  $y$  is equal to:

- a. -9
- b. -1
- c. 2
- d. 4
- e. 6
- f. 8
- g. 9
- h. 18



2. Another teacher taught two classes: one in the morning and one in the afternoon. The average rating for both classes was also 0. Solve for the two unknowns,  $x$  and  $y$ .

Morning class

<b>Ratings</b>	$x$	$y$	5
<b>Number of Students</b>	3	-5	-1

Afternoon class

<b>Ratings</b>	$x$	$y$	-2
<b>Number of Students</b>	4	-9	1

The unknown rating  $x$  is equal to:

- a. -5
- b. 3
- c. 5
- d. 7
- e. 8
- f. 9
- g. 12
- h. 15

The unknown rating  $y$  is equal to:

- a. -1
- b. -2
- c. 2
- d. 4
- e. 6
- f. 8
- g. 9
- h. 18

**Task M1: Instructions**

- M In this task, rate how similar pairs of systems are. These different systems consist of balance beams, student rating problems, and truck problems. Each system comes from the preceding parts of this questionnaire.
- " Each system contains a Subsystem A and a Subsystem B.
  - " There are relationships between the subsystems. You need to examine them, looking at the things that the subsystems have in common with one another.
- M Remember, for all the student-ratings problems the following apply. Once upon a time there was this strange school on another planet. There could even be negative numbers of students. The school used very strange method for balancing the number of strong and weak students in a class.
- " All the students were rated on a scale of -100 to 100 (negative one hundred to positive one hundred).
  - " The average rating of the students was always maintained at 0 in each class.
  - " When the class average was not 0, the balance between strong and weak students was upset. Then, the principal added new students so the class average was 0 again.
- M Please study all the systems carefully before answering.
- " Solve for the unknown values in each system unless they are already solved.
  - " Describe the properties of the systems.
  - " Use the M1 answer sheet for your answers.
  - " Rate all the possible pairs of systems as to their similarity.
    - R High ratings indicate similarity.
    - R Low ratings indicate differentness.
  - " Explain your reasons for saying how similar.
- M On the following pages there is a sample problem with only three systems
- " They happen to be balance beams but do not have to be.
  - " This example is to help you with the main problem (M1).

## Sample Problem with Three Systems, Task M1

## Sample System 1

Subsystem A	5	4	3	2	1	0	1	2	3	4	5
						△					
		<b>2</b>								<b>2</b>	

Subsystem B	5	4	3	2	1	0	1	2	3	4	5
						△					
	<b>1</b>										<b>1</b>

## Sample System 2

Subsystem A	5	4	3	2	1	0	1	2	3	4	5
$x = 6, y = 6$						△					
											<b>6</b>
	<b>6</b>										

Subsystem B	5	4	3	2	1	0	1	2	3	4	5
$x = 5, y = 5$						△					
											<b>5</b>
	<b>5</b>										

## Sample System 3

Subsystem A	5	4	3	2	1	0	1	2	3	4	5
$x = 6, y = 4$						△					
											<b>4</b>
	<b>6</b>										

Subsystem B	5	4	3	2	1	0	1	2	3	4	5
$x = 5, y = 10$						△					
											<b>10</b>
	<b>5</b>										

On the next page, there is a sample answer sheet containing suggested ratings. These ratings tell you how similar or dissimilar the system pairs are.

## Sample Answer Sheet

Systems compared	Check if most similar	Similarity ratings 0    1    2    3    4    5    6    7 Dissimilar <span style="float: right;">Most similar</span> <b>The suggested responses are in bold italics.</b>
1	✓	0    1    2    3    4    5    6 <b><i>7</i></b>
1 & 3		0    1    2 <b><i>3</i></b> 4    5    6    7
2 & 3		0    1    2 <b><i>3</i></b> 4    5    6    7

## Task M1

## System 1

**Subsystem A** In one class,  $x + 6$  students each received a rating of 1. The other 5 students received a rating of  $x$ .

<b>Ratings</b>	1	$x$
<b>Number of Students</b>	$x + 6$	5

**Subsystem B** In one class,  $y + 6$  students each received a rating of 500. The other 5 students received a rating of  $500y$ .

<b>Ratings</b>	500	$500y$
<b>Number of Students</b>	$y + 6$	5

$$x = ?$$

$$y = ?$$

## System 2

**Subsystem A**

7	6	5	4	3	2	1	0	1	2	3	4	5	6	7
						$x$	$\Delta$					$y$		

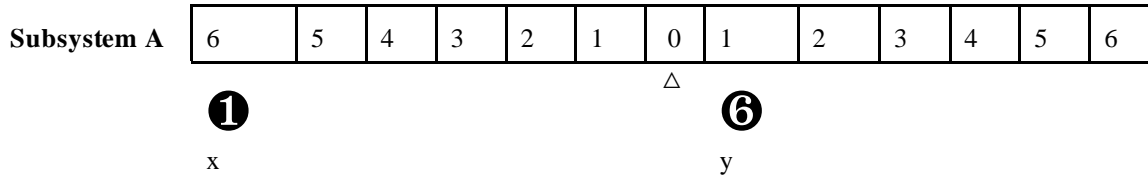
**Subsystem B** In one class,  $x$  students each received a rating of 6. The other  $x$  students received a rating of  $-5 - y$ .

<b>Ratings</b>	6	$-5 - y$
<b>Number of Students</b>	$x$	5

$$x = ?$$

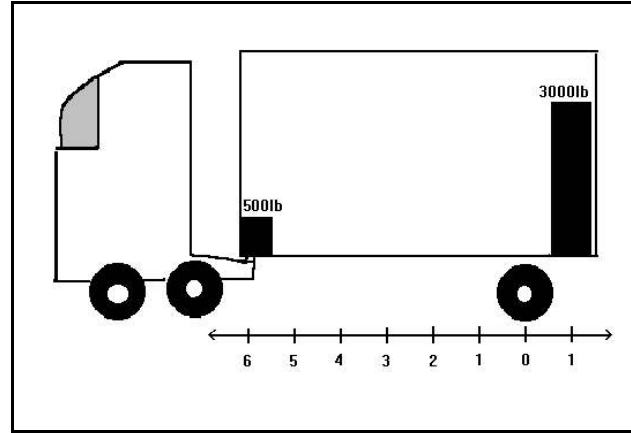
$$y = ?$$

## System 3



**Subsystem B**

This truck is poorly designed to bear weight. Recently, the trucking company came up with a new system that allowed them to stack more freight toward the rear of the trailer and thereby increase the size of each shipment: A heavy weight was placed inside the trailer all the way to the front. A 500 lb weight placed up front balances 3000 lbs of freight loaded in back, provided that everything in the trailer is firmly secured.



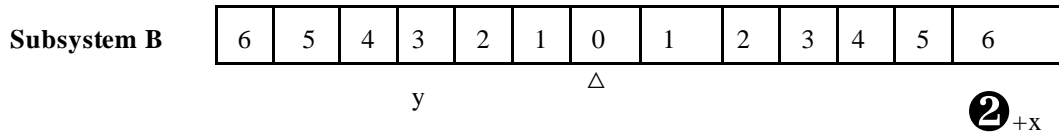
x = ?  
y = ?

## System 4

**Subsystem A** In one class, the strong students received a rating of y. The teacher thought the other x students should receive a rating of -8. How many were in this second group of students in order for the balance between strong and weak students to be maintained?

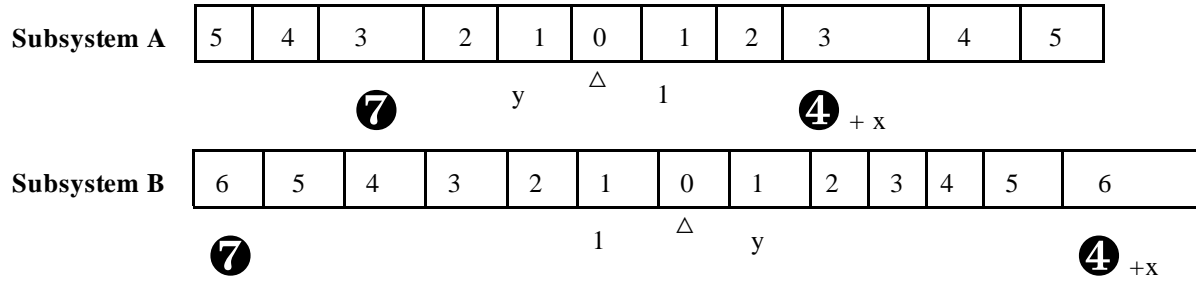
<b>Ratings</b>	y	-8
<b>Number of Students</b>	2	x

The **same** x and the y are in this balance beam.



x = ?  
y = ?

## System 5



$y = 1$   
 $x = ?$

## The Answer Sheet

### Answers for Task M: Compare the 5 system pairs to one another.

Systems compared	Check if most similar	Similarity Rating:							
		0	1	2	3	4	5	6	7
		Dissimilar				Most similar			
1 & 2		0	1	2	3	4	5	6	7
1 & 3		0	1	2	3	4	5	6	7
1 & 4		0	1	2	3	4	5	6	7
1 & 5		0	1	2	3	4	5	6	7
2 & 3		0	1	2	3	4	5	6	7
2 & 4		0	1	2	3	4	5	6	7
2 & 5		0	1	2	3	4	5	6	7
3 & 4		0	1	2	3	4	5	6	7
3 & 5		0	1	2	3	4	5	6	7
4 & 5		0	1	2	3	4	5	6	7



## The Answer Sheet 2 Optional

**Answers for Task M: Compare the 5 system pairs to one another.**

Systems compared	Check which pair of pairs is most similar	Pairs of Systems 1 is _____ than Pair 2		
		Dissimilar	Same Similarity	More Similar
1 & 2 or 1 & 3		1	2	3
1 & 2 or 1 & 4		1	2	3
1 & 2 or 1 & 5		1	2	3
2 & 1 or 2 & 3		1	2	3
2 & 1 or 2 & 4		1	2	3
2 & 1 or 2 & 5		1	2	3
1 & 3 or 1 & 4		1	2	3
1 & 3 or 1 & 5		1	2	3
3 & 1 or 3 & 2		1	2	3
3 & 1 or 3 & 4		1	2	3
3 & 1 or 3 & 5		1	2	3
1 & 4 or 1 & 5		1	2	3
4 & 1 or 4 & 2		1	2	3
4 & 1 or 4 & 3		1	2	3
4 & 1 or 4 & 5		1	2	3
5 & 1 or 5 & 2		1	2	3
5 & 1 or 5 & 3		1	2	3
5 & 1 or 5 & 4		1	2	3





# Motivation For Doing Problems

Subject number \_\_\_\_\_ Date \_\_\_\_\_  
 Last 4 Digits of Your Social Security Number \_\_\_\_\_ Month \_\_\_\_\_ Day \_\_\_\_\_ Year \_\_\_\_\_

Name of Administrator of problem \_\_\_\_\_  
 Please print.

1. Please state your reasons why you thought you should do these problems.

2. Please state your reasons why you thought you should do these problems well.

3. How much total time did you spend on doing this problems?

First time:

- 4. At what time did you start working on these problems? \_\_\_\_\_
- 5. At what time did you stop? \_\_\_\_\_
- 6. What problem had you started when you stopped?
- 7. Why did you stop?

Second time:

- 8. At what time did you start working on these problems \_\_\_\_\_
- 9. At what time did you start stop \_\_\_\_\_
- 10. Why did you stop?

11. To what degree did doing well matter to you Not at all 0 1 2 3 4 5 6 7 Totally  
 12. Why?

13. I am the \_\_\_\_\_ of the researcher?

- \_\_\_ Student of \_\_\_ Student in the school \_\_\_ Student of a Colleague
- \_\_\_ Not related \_\_\_ Brother \_\_\_ Sister \_\_\_ Mother \_\_\_ Father \_\_\_ Cousin \_\_\_ Uncle \_\_\_ Aunt
- \_\_\_ Nephew \_\_\_ Niece \_\_\_ Fiance \_\_\_ Boy Friend \_\_\_ Girl Friend \_\_\_ Husband \_\_\_ Wife \_\_\_ Ex-spouse

14. If so, did your relationship to the researcher motivate you to try harder?

15. Was there any reward given to you after you finished the problems?

16. If so, what was it?

- 17. My grade point average in high school was D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 18. My grade point average in my 1st college was D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 19. My grade point average in my 2nd college was D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_

My grade was in:

- 20. Algebra 1 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 21. Algebra 2 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 22. Geometry 1 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 23. Geometry 2 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 24. PreCalculus Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 25. Trigonometry Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 26. College Algebra Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 27. Calculus 1 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 28. Calculus 2 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 29. Calculus 3 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 30. Calculus 4 Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_
- 31. Other Did not take\_\_\_, F\_\_\_, D\_\_\_, C-\_\_\_, C\_\_\_, C+\_\_\_ B-\_\_\_, B\_\_\_, B+\_\_\_, A-\_\_\_, A\_\_\_

Please rate these possible reasons for doing the problems

	Strongly Disagree									Strongly Agree
32. I was wide awake.	0	1	2	3	4	5	6	7		
33. Good people do these problems.	0	1	2	3	4	5	6	7		
34. Inner city kids will benefit from our doing these problems.	0	1	2	3	4	5	6	7		
35. Other present students will benefit from our doing these problems.	0	1	2	3	4	5	6	7		
36. Future students will benefit from our doing these problems.	0	1	2	3	4	5	6	7		
37. I benefit from the results of research. Therefore, I should participate in it.	0	1	2	3	4	5	6	7		
38. Doing this project will help the school.	0	1	2	3	4	5	6	7		
39. Doing this project will help raise my grade or my friend's, relative's or roommate's grade.	0	1	2	3	4	5	6	7		
40. If I do not do this, either the dean, my advisor or professor or my friend, relative or mate, etc will hate me.	0	1	2	3	4	5	6	7		
41. This is a stupid study, but I have to do it because it is the rule.	0	1	2	3	4	5	6	7		
42. If I do these problems, either the dean, my advisor or professor will think that I am a good student or that my friend, relative or mate is a good student.	0	1	2	3	4	5	6	7		
43. Mainly, I do these problems so the school will not keep me from graduating.	0	1	2	3	4	5	6	7		
44. As a student, I am interested in how adults develop.	0	1	2	3	4	5	6	7		
45. This will give me some idea of how subjects experience being tested, so that when I become a professional, I will be able to do a more professional job.	0	1	2	3	4	5	6	7		
46. I care about my school and want to help it.	0	1	2	3	4	5	6	7		
47. I care about my associates school and want to help them.	0	1	2	3	4	5	6	7		
48. Give us you inputs on the problems.										

Many thanks to you for doing these problems. Your time was greatly appreciated.

© Dare Association, Inc. 54:18;09-10-95-20 (Monday, October 9, 1995; 6:54 pm)

18:14;18-01-96-20 (Thursday, January 18, 1996; 2:18 pm)

53:18;09-10-95-20 (Monday, October 9, 1995; 6:53 pm) Form 3a-6

56:09;02-08-95-20 (Wednesday, August 2, 1995; 9:56am) Form 3a-5

35:03;08-03-95-20 (Wednesday, March 8, 1995; 3:35am)