

# Exploring Increasing Patterns



## Quick Review

Here are 2 **increasing patterns**.

- This pattern grows by the same number of blocks each time.

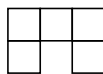


Figure 1

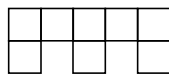


Figure 2

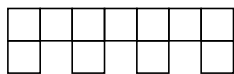


Figure 3

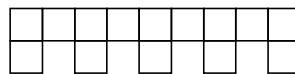


Figure 4

The **pattern rule** is:

- Start with . Add each time.

- This pattern grows by a different number of blocks each time.



Figure 1



Figure 2

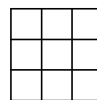


Figure 3

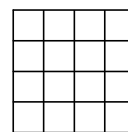


Figure 4

The pattern rule is:

- Start with 1 .
- Add 3 to make a larger square.
- Then, add 2 more s than the time before.

## Try These

1. a) Use Pattern Blocks.

Make the next 3 figures in this increasing pattern.



Figure 1

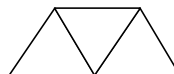


Figure 2

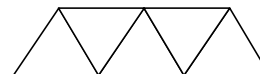
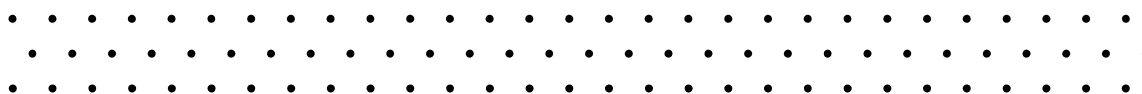


Figure 3

- b) Draw the pattern on the dot paper.

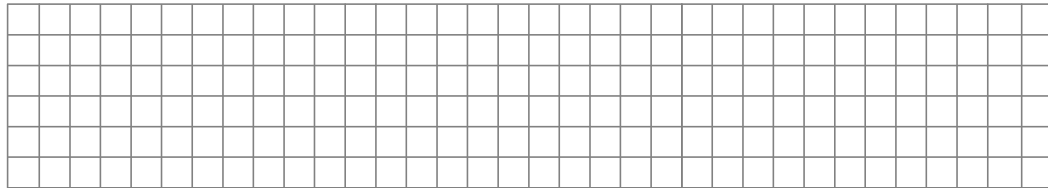
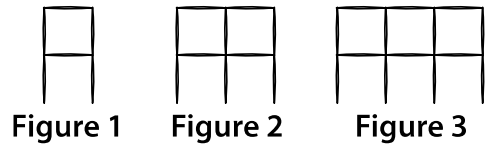


- c) Write the pattern rule.

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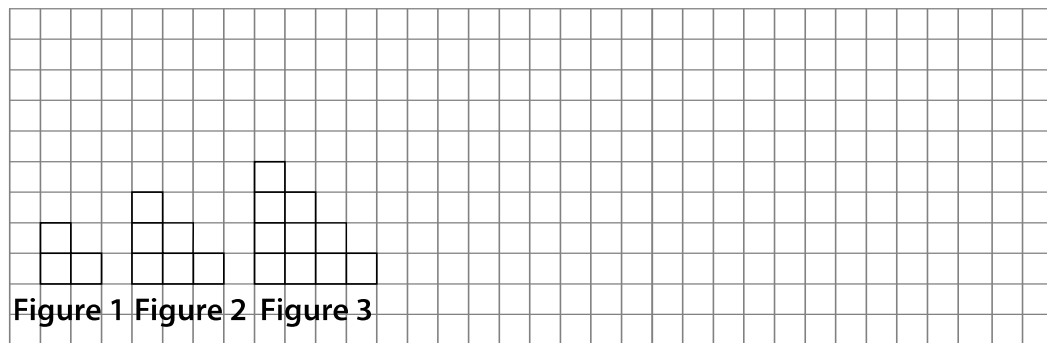
## Practice

1. a) Use toothpicks. Copy the pattern.  
Make the next 3 figures.  
Draw the pattern on grid paper.



- b) Write the pattern rule. \_\_\_\_\_

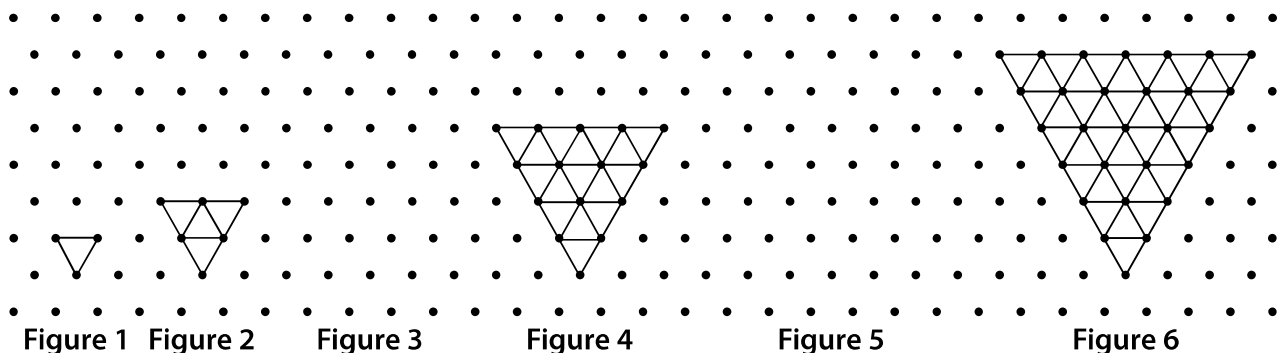
2. a) Draw the next 3 figures in this increasing pattern.



- b) Write the pattern rule. \_\_\_\_\_

## Stretch Your Thinking

Figure 3 and Figure 5 are missing. Draw what they should be.



# Creating Increasing Patterns





## Quick Review

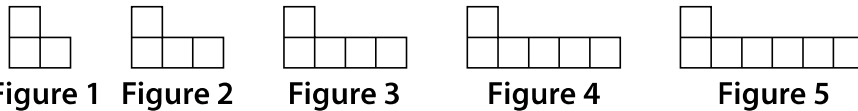
To make an increasing pattern you:

- create a starting point
- decide what to change each time



➤ Here is Fumiko's pattern rule:

- Start with . Add 1  each time.

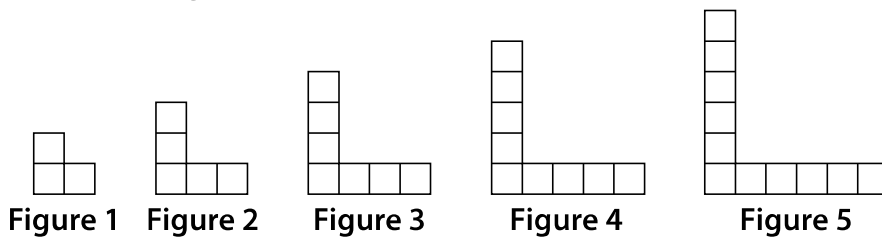
His pattern grows in 1 direction.



➤ Here is Serena's pattern rule:

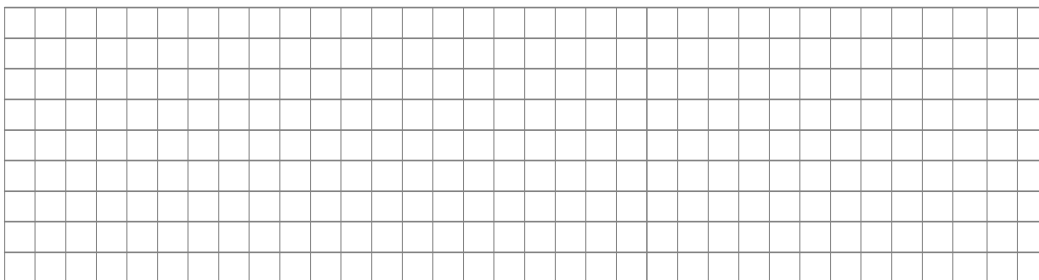
- Start with . Add 2 s each time.

Her pattern grows in more than 1 direction.



## Try These

1. Draw a pattern that uses this rule:  
Start with 2 squares. Add 2 squares each time.



## Practice

1. a) Draw the first 4 figures of an increasing pattern.

b) Describe your pattern using numbers and words.

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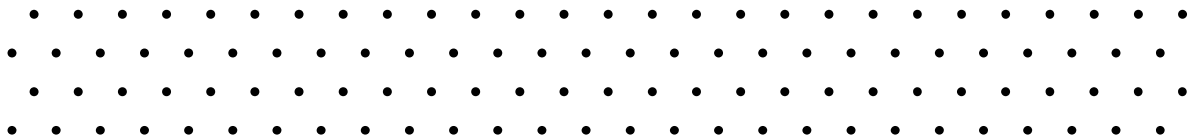
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2. a) Write an increasing pattern rule.

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b) Draw the first 4 figures of your pattern.

3. Draw a pattern that uses the rule:  
Start with 1 triangle. Add 1 triangle each time.



## Stretch Your Thinking

Use toothpicks to make an increasing pattern.  
Draw the first 4 figures of your pattern. Write the pattern rule.

# Comparing Increasing Patterns



## Quick Review

- These patterns use the same starting point but they increase in different ways.



Figure 1



Figure 2

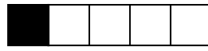


Figure 3



Figure 4



Figure 1



Figure 2



Figure 3

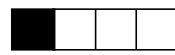


Figure 4

- These patterns use different starting points but they increase the same way.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 1



Figure 2



Figure 3



Figure 4

## Try These

- Write the pattern rule for each increasing pattern.

a)



Figure 1



Figure 2



Figure 3

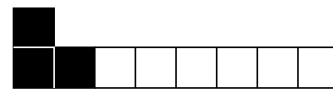


Figure 4

b)



Figure 1

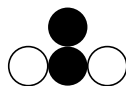


Figure 2

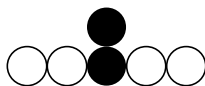


Figure 3

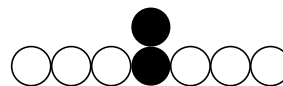


Figure 4

## Practice

1. a) Write the pattern rule.



Figure 1



Figure 2



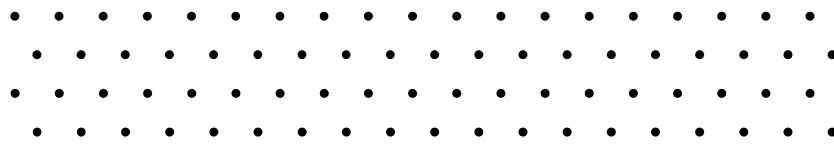
Figure 3



Figure 4

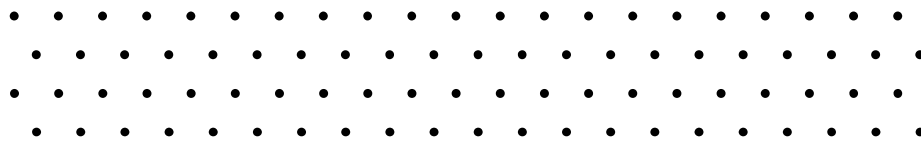
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b) Draw a pattern that has the same starting point but increases a different way. Write the pattern rule.




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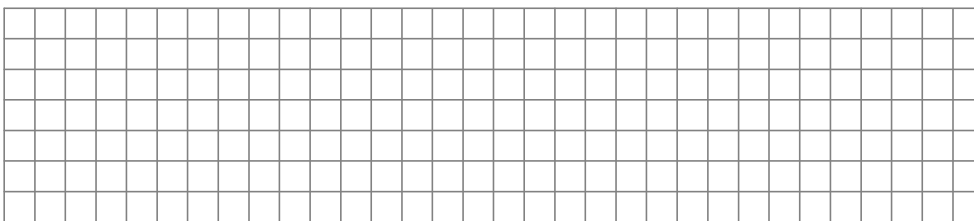
c) Draw a pattern that has a different starting point but increases the same way. Write the pattern rule.




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## Stretch Your Thinking

Start with 2 squares. Draw the first 4 figures of an increasing pattern.



Compare your pattern with that of a classmate.

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# Increasing Number Patterns



## Quick Review

Look at the increasing patterns in the hundred chart.

- The pattern rule for the shaded squares is:

- Start at 4. Add 10 each time.

The tens digit increases by 1.

The ones digit is always 4.

- The pattern rule for the circled numbers is:

- Start at 3. Add 3 each time.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

## Try These

- Describe this pattern using numbers and words.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

\_\_\_\_\_

- Fill in the missing numbers. Write the pattern rule.

a) 40, 45, 50, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

b) 26, 28, 30, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

c) 20, 30, 40, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

d) 18, 21, 24, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

## Practice

1. Use a different colour for each pattern.

a) Start at 47. Add 10 each time.

b) Start at 84. Add 4 each time.

c) Start at 35. Add 5 each time.

d) Start at 33. Add 3 each time.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2. Suppose you have 7 dimes. Show how much money you have.

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3. Matsumo earns \$5 a day babysitting. How much money will he have after 8 days? Show how you know.

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4. Fill in the missing numbers.

a) 52, 54, 56, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

b) 15, 25, 35, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

c) 3, 13, 23, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

## Stretch Your Thinking

Suppose you start at 43 and count by 10s to 93.

Would you say 63? 85? Why or why not?

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Suppose you start at 24 and count by 2s to 48.

Would you say 40? 47? Why or why not?

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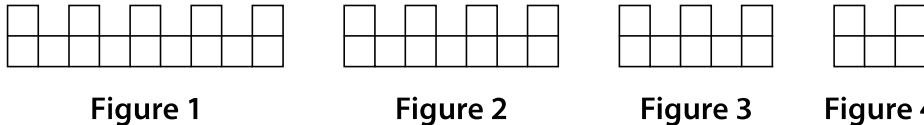
# Exploring Decreasing Patterns



## Quick Review

Shrinking patterns are **decreasing patterns**.

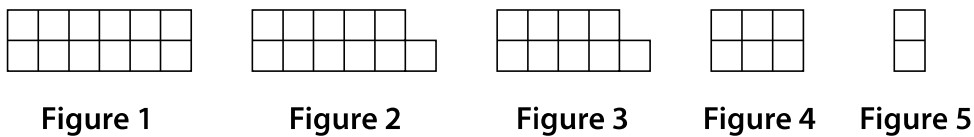
- This pattern decreases by the same number of squares each time.



The pattern rule is:

- Start with 14 □s. Remove 3 □s each time.

- This pattern decreases by a different number of squares each time.

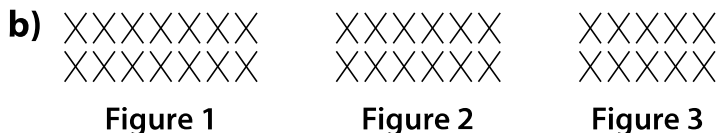
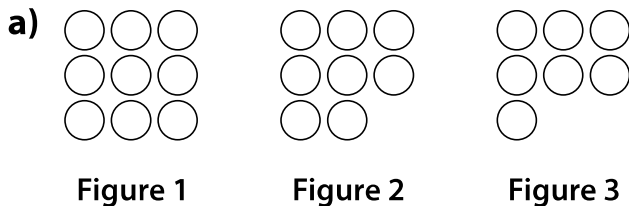


The pattern rule is:

- Start with 12 □s. Remove 1 □.
- Then, remove 1 more □ than the time before.

## Try These

1. Draw the next 2 figures in each decreasing pattern.



2. Look at the patterns in question 1. Write the pattern rule for each.

- a) \_\_\_\_\_
- b) \_\_\_\_\_

## Practice

1. a) Draw the next 2 figures in this decreasing pattern.

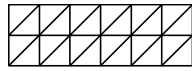


Figure 1

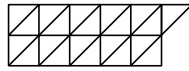


Figure 2

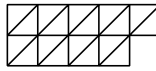


Figure 3

- b) Write the pattern rule.

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2. a) Use toothpicks. Make the next 2 figures in the decreasing pattern. Draw the figures.



Figure 1



Figure 2



Figure 3

- b) Write the pattern rule.

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3. Crystal made a decreasing pattern out of squares.

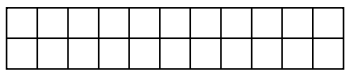


Figure 1

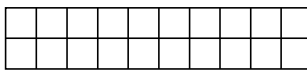


Figure 2

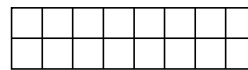


Figure 3

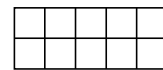


Figure 4

How many more figures can she make? \_\_\_\_\_ How do you know?

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## Stretch Your Thinking

Use square tiles to make a decreasing pattern.  
Draw the first 4 figures of your pattern.

Write the pattern rule.

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# Creating and Comparing Decreasing Patterns



## Quick Review

► Cassie chose this pattern rule:

- Start with 10 ○s in a line. Remove 3 ○s each time.



Figure 1



Figure 2



Figure 3



Figure 4

► Helio chose this pattern rule:

- Start with 10 ○s in a line. Remove 1 ○.
- Then, remove 1 more ○ than the time before.



Figure 1



Figure 2



Figure 3



Figure 4

Their patterns have the same starting point but they decrease in different ways.

## Try These

1. How are these patterns the same? How are they different?

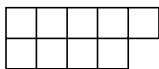
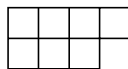


a)    

Figure 1      Figure 2      Figure 3      Figure 4

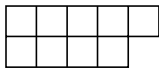
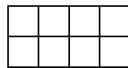


b)    

Figure 1      Figure 2      Figure 3      Figure 4

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## Practice

1. Use counters. Draw the first 4 figures for each pattern rule.

a) Start with 12 counters. Remove 2 counters each time.

b) Start with 15 counters. Remove 1 counter. Then, remove 1 more counter than the time before.

2. Draw the missing figure.

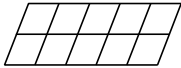


Figure 1

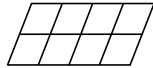


Figure 2



Figure 4

## Stretch Your Thinking

Draw the first 4 figures of a decreasing pattern.

Compare your pattern with that of a classmate.

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# Decreasing Number Patterns



## Quick Review

Look at the decreasing patterns in the 100-to-1 chart.

- The pattern rule for the shaded squares is:
  - Start at 100. Count back by 10s each time.
- The pattern rule for the circled numbers is:
  - Start at 42. Count back by 3s each time.

100	99	98	97	96	95	94	93	92	91
90	89	88	87	86	85	84	83	82	81
80	79	78	77	76	75	74	73	72	71
70	69	68	67	66	65	64	63	62	61
60	59	58	57	56	55	54	53	52	51
50	49	48	47	46	45	44	43	42	41
40	39	38	37	36	35	34	33	32	31
30	29	28	27	26	25	24	23	22	21
20	19	18	17	16	15	14	13	12	11
10	9	8	7	6	5	4	3	2	1

## Try These

1. Use this hundred chart.
  - a) Start at 40. Count back by 5s. Shade the numbers green.
  - b) Start at 14. Count back by a different number. Shade the numbers yellow.

100	99	98	97	96	95	94	93	92	91
90	89	88	87	86	85	84	83	82	81
80	79	78	77	76	75	74	73	72	71
70	69	68	67	66	65	64	63	62	61
60	59	58	57	56	55	54	53	52	51
50	49	48	47	46	45	44	43	42	41
40	39	38	37	36	35	34	33	32	31
30	29	28	27	26	25	24	23	22	21
20	19	18	17	16	15	14	13	12	11
10	9	8	7	6	5	4	3	2	1

2. Write the first 5 numbers in each pattern.
  - a) Start at 50. Count back by 5s each time. \_\_\_\_\_
  - b) Start at 47. Count back by 10s each time. \_\_\_\_\_
  - c) Start at 53. Count back by 3s each time. \_\_\_\_\_

## Practice

1. Fill in the missing numbers. Write the pattern rule.

a) 58, 56, 54, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ \_\_\_\_\_

b) 75, 65, 55, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ \_\_\_\_\_

c) 68, 65, 62, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ \_\_\_\_\_

2. a) Shade a decreasing number pattern on the hundred chart. Write the pattern rule.

100	99	98	97	96	95	94	93	92	91
90	89	88	87	86	85	84	83	82	81
80	79	78	77	76	75	74	73	72	71
70	69	68	67	66	65	64	63	62	61
60	59	58	57	56	55	54	53	52	51
50	49	48	47	46	45	44	43	42	41
40	39	38	37	36	35	34	33	32	31
30	29	28	27	26	25	24	23	22	21
20	19	18	17	16	15	14	13	12	11
10	9	8	7	6	5	4	3	2	1

\_\_\_\_\_

\_\_\_\_\_

b) Circle a different decreasing number pattern on the hundred chart. How are your patterns the same? How are they different?

\_\_\_\_\_

\_\_\_\_\_

3. Kazuo had twenty-four dollars.

Each day he spent two dollars.

How much money did Kazuo have after 8 days? \_\_\_\_\_

## Stretch Your Thinking

Suppose you start at 95 and count back to 35.

a) If you count back by 10s, will you say 60? How do you know?

\_\_\_\_\_

b) If you count back by 5s, will you say 50? How do you know?

\_\_\_\_\_

\_\_\_\_\_