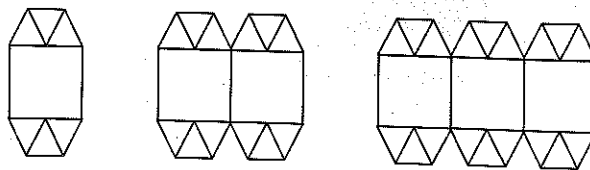


# PA6-15: Finding Rules for T-tables – Part I

Andre makes a garden path using 6 triangular stones for every 1 square stone.



He writes an equation that shows how to calculate the number of triangles from the number of squares:

$$\text{squares} \times 6 = \text{triangles}$$

or (for short):  $6 \times s = t$

Squares (s)	$6 \times s = t$	Triangles (t)
1	$6 \times 1 = 6$	6
2	$6 \times 2 = 12$	12
3	$6 \times 3 = 18$	18

1. Each chart represents a different design for a path. Complete the charts:

a)

Squares (s)	$4 \times s = t$	Triangles (t)
1	$4 \times 1 = 4$	4
2	$4 \times \square = 8$	
3	$4 \times \square = 12$	

b)

Squares (s)	$3 \times s = t$	Triangles (t)
1	$3 \times \square = 3$	
2	$3 \times \square = 6$	
3	$3 \times \square = 9$	

2. Write a rule that tells you how to calculate the number of triangles from the number of squares:

a)

Squares	Triangles
1	4
2	8
3	12

b)

Squares	Triangles
1	5
2	10
3	15

c)

Squares	Triangles
1	2
2	4
3	6

d)

Squares	Triangles
1	6
2	12
3	18

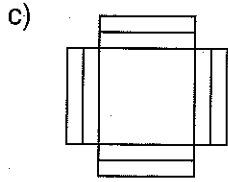
3. Wendy makes broaches using squares (s), rectangles (r), and triangles (t). Complete the chart. Write an equation (such as  $4 \times s = t$ ) for each design:

a)

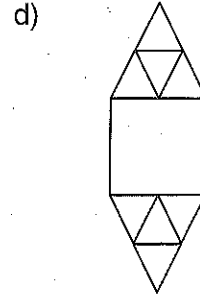
Squares (s)	Rectangles (r)
1	
2	
3	

b)

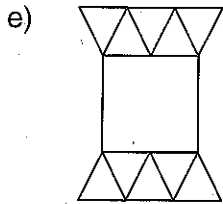
Rectangles (r)	Triangles (t)
1	
2	
3	



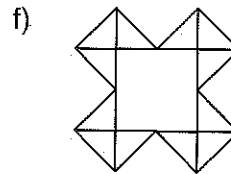
Squares (s)	Rectangles (t)



Squares (s)	Triangles (t)



Squares (s)	Triangles (t)

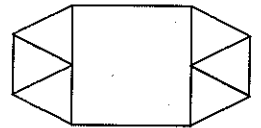


Squares (s)	Triangles (t)

4. Wendy has 39 triangles.

Does she have enough triangles to make 7 broaches using the design here?

How can you tell without making a chart?



5. Create a design using squares (s) and triangles (t) to go with each equation:

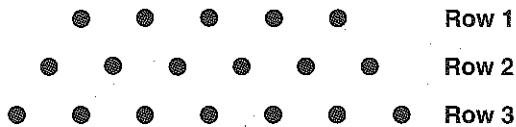
a)  $6 \times s = t$

b)  $5 \times s = t$

6. Create a design with squares and triangles and then write an equation for your design:

In the auditorium, the number of chairs in each row is always 4 greater than the row number. Kelly writes an equation that shows how to calculate the number of chairs from the row number:

row number + 4 = number of chairs (or  $r + 4 = c$  for short)



Row	$r + 4 = c$	Chairs
1	<input type="text" value="1"/> + 4 = 5	5
2	<input type="text" value="2"/> + 4 = 6	6
3	<input type="text" value="3"/> + 4 = 7	7

7. Each chart represents a different arrangement of chairs. Complete the charts:

a)

Row	$r + 6 = c$	Chairs
1	<input type="text" value="1"/> + 6 = 7	7
2	<input type="text"/> + 6 =	
3	<input type="text"/> + 6 =	

b)

Row	$r + 9 = c$	Chairs
1	<input type="text"/> + 9 =	
2	<input type="text"/> + 9 =	
3	<input type="text"/> + 9 =	

8. Say what number you must add to the row number to get the number of chairs. Write an equation using  $r$  for the row number and  $c$  for the number of chairs:

a)

Row	Chairs
1	5
2	6
3	7

Add 4  
 $r + 4 = c$

b)

Row	Chairs
1	8
2	9
3	10

c)

Row	Chairs
1	9
2	10
3	11

d)

Row	Chairs
7	12
8	13
9	14

9. Complete the charts. Then, in the box provided, write an equation for each arrangement of chairs:

a)

Row	Chairs

b)

Row	Chairs

10. Apply the given rule to the numbers in the input column. Write your answer in the output column:

a)

INPUT	OUTPUT
1	
2	
3	

**Rule:**  
Add 4 to the input.

b)

INPUT	OUTPUT
5	
6	
7	

**Rule:**  
Subtract 4 from the input.

c)

INPUT	OUTPUT
3	
5	
6	

**Rule:**  
Multiply the input by 6.

d)

INPUT	OUTPUT
32	
8	
40	

**Rule:**  
Divide each input by 4.

e)

INPUT	OUTPUT
18	
19	
20	

**Rule:**  
Add 10 to the input.

f)

INPUT	OUTPUT
4	
5	
6	

**Rule:**  
Multiply the input by 8.

11. For each chart, give a rule that tells you how to make the output numbers from the input numbers.

a)

INPUT	OUTPUT
2	6
3	7
4	8

**Rule:**

b)

INPUT	OUTPUT
3	8
5	10
7	12

**Rule:**

c)

INPUT	OUTPUT
1	7
2	14
3	21

**Rule:**

d)

INPUT	OUTPUT
3	15
2	10
1	5

**Rule:**

e)

INPUT	OUTPUT
2	16
4	32
6	48

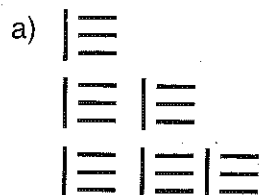
**Rule:**

f)

INPUT	OUTPUT
19	16
15	12
21	18

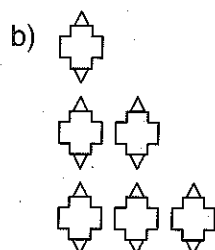
**Rule:**

1. Complete the T-table for each pattern.  
Then write a rule that tells you how to calculate the second number from the first number.



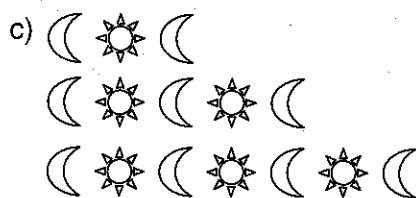
Number of Vertical Lines	Number of Horizontal Lines

Rule:



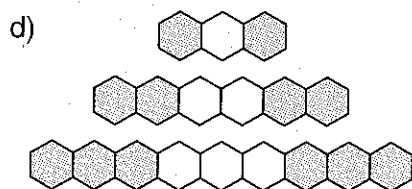
Number of Crosses	Number of Triangles

Rule:



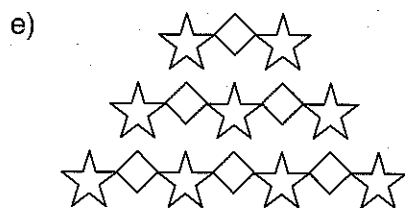
Number of Suns	Number of Moons

Rule:



Number of Light Hexagons	Number of Dark Hexagons

Rule:

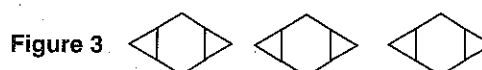
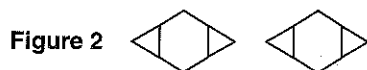
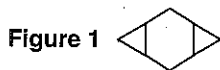


Number of Diamonds	Number of Stars

Rule:



2. Make a T-table and write a rule for the number of hexagons and triangles:



3. How many triangles are needed for 9 hexagons in the pattern in Question 2? How do you know?

4. Write a rule that tells you how to make the Output from the Input:  
Each rule may involve either one or two operations.

a)

Input	Output
1	2
2	7
3	12
4	17

Rule:

b)

Input	Output
1	3
2	9
3	15
4	21

Rule:

c)

Input	Output
1	5
2	6
3	7
4	8

Rule:

d)

Input	Output
1	7
2	9
3	11
4	13

Rule:

e)

Input	Output
0	4
1	8
2	12
3	16

Rule:

f)

Input	Output
1	4
2	8
3	12
4	16

Rule:

**BONUS**

5. Find the rule by guessing and checking.

a)

Input	Output
5	27
6	32
7	37
8	42

Rule:

b)

Input	Output
4	7
5	9
6	11
7	13

Rule:

c)

Input	Output
57	63
58	64
59	65
60	66

Rule:

d)

Input	Output
2	7
4	13
6	19
8	25

Rule:

e)

Input	Output
10	31
9	28
3	10
1	4

Rule:

f)

Input	Output
8	13
4	5
3	3
7	11

Rule:

# PA6-21: Applying Rules for Patterns – Part III

1. For each, draw Figure 4 and fill in the T-table.  
Then write a rule that tells you how to calculate the input from the output:

a)      1                      2                      3                      4

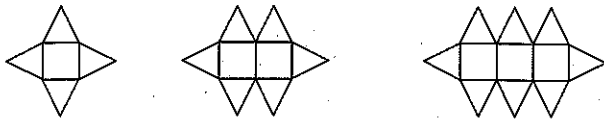


Figure	Number of Triangles
1	
2	
3	
4	

Rule for T-table: \_\_\_\_\_

Use your rule to predict how many triangles will be needed for Figure 9: \_\_\_\_\_

b)      1                      2                      3                      4

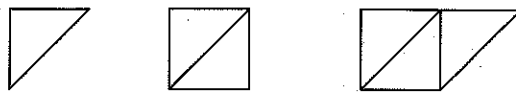


Figure	Perimeter
1	
2	
3	
4	

Rule for T-table: \_\_\_\_\_

Use your rule to predict the number of line segments in Figure 11: \_\_\_\_\_

c)      1                      2                      3                      4

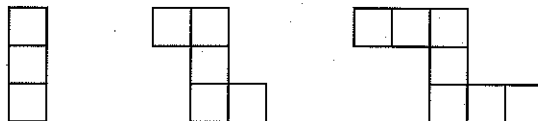


Figure	Number of Squares
1	
2	
3	
4	

Rule for T-table: \_\_\_\_\_

Use your rule to predict the number of squares needed for Figure 10: \_\_\_\_\_

d)      1                      2                      3                      4

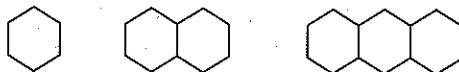


Figure	Perimeter
1	
2	
3	
4	

Rule for T-table: \_\_\_\_\_

Use your rule to predict the perimeter of Figure 23: \_\_\_\_\_