Name_____ 5.17

Input/output tables

Follow the Rules!

Can you complete each of the following input/output tables? First, decide on the rule that is being used in each table and write it where indicated. Apply that rule to each number in the input column; then write your answer in the output column. Or, if you have the output number, work backward to find the input number. Two tables have been done for you.

Part I: Each rule has one operation.

1. rule: − 3	
input	output
10	7
14	11
6	3
7	4
9	6
20	17

2. rule:	
input	output
3	10
4	11
5	
10	
	21
20	27

3. rule:	
input	output
0	0
1	4
	8
5	20
8	
11	44

4. rule:	
input	output
10	
15	3
20	
30	6
50	10
45	

Part II: Each rule has two operations. See the hint. (The operations in the hint may not be used in the order in which they are listed.)

5. rule: × 2, + 1	
input	output
6	13
7	15
10	21
14	29
2	5
20	41

(Hint: x and +)

6. rule:	
input	output
	10
16	11
22	14
50	28
8	
30	18

(Hint: ÷ and +)

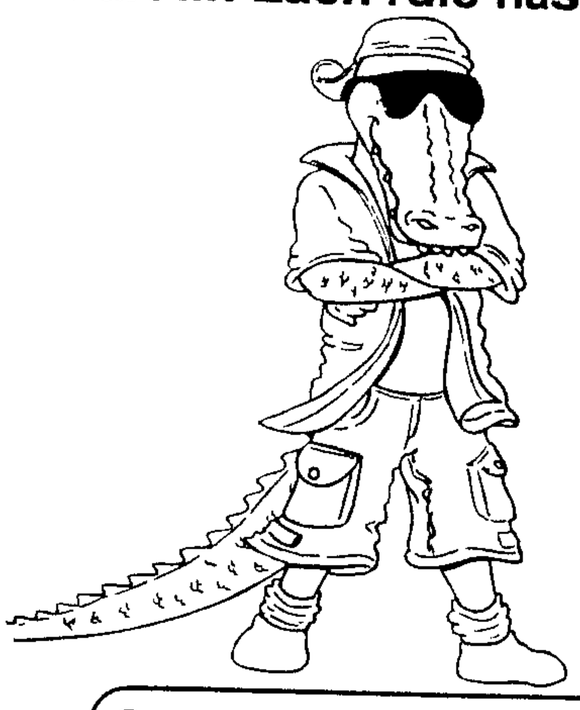
7. rule:	
input	output
2	11
	20
	35
7	26
15	50
6	23

(Hint: + and x)

8. rule:	
input	output
10	12
15	22
21	
6	4
29	50
	2

(Hint: – and x)

Part III: Each rule has two operations. No hints!



9. rule:	
input	output
5	2
11	4
17	
20	7
	10
8	3

10. rule:	
input	output
5	15
	19
10	25
1	7
20	
22	49

Bonus Box: Make an input/output table that includes fractions or decimals. (Don't write your rule in the table.) List six input and six output numbers. Exchange tables with a partner and see if you can figure out each other's rule.

Name_____ 5.17

Completing function tables

Tinkering With Function Tables

Timothy Tinker loves tinkering with function machines. He's programmed the machines below to give you some advice about working with function tables. Follow the directions to find Timothy's advice.

Directions: Complete each function table. Then write the uppercase letter beside each boxed number in the blanks below.

1. Rule: ÷ 4, + 3

	Input	Output
	20	8
	36	12
a.	W ☐	4
b.	48	☐ A
c.	U ☐	18

2. Rule: x 8, ÷ 4

	Input	Output
a.	E ☐	24
	10	20
b.	15	☐ S
	9	18
c.	80	☐ H

3. Rule: – 3, + 12

	Input	Output
a.	L ☐	36
	18	27
b.	49	☐ L
c.	T ☐	161
	406	415

4. Rule: ÷ 3, + 5

	Input	Output
	27	14
a.	129	☐ L
	48	21
b.	S ☐	32
	15	10

5. Rule: – 6, x 2

	Input	Output
	31	50
	18	24
a.	O ☐	132
	95	178
b.	320	☐ W

6. Rule: + 7, ÷ 2

	Input	Output
a.	E ☐	10
	289	148
b.	A ☐	19
	1,003	505
c.	727	☐ L

7. Rule: ÷ 2, + 3

	Input	Output
	80	☐ Y
a.	128	67
	R ☐	165
b.	36	21
	58	32

8. Rule: + 1,000, – 100

	Input	Output
	80	980
a.	O ☐	1,023
	1,589	2,489
b.	762	☐ F
	14	914

31	58	628	15	43	81	1,662	72	367	27	123	4	152	160	12	324	60	48	13	30	!

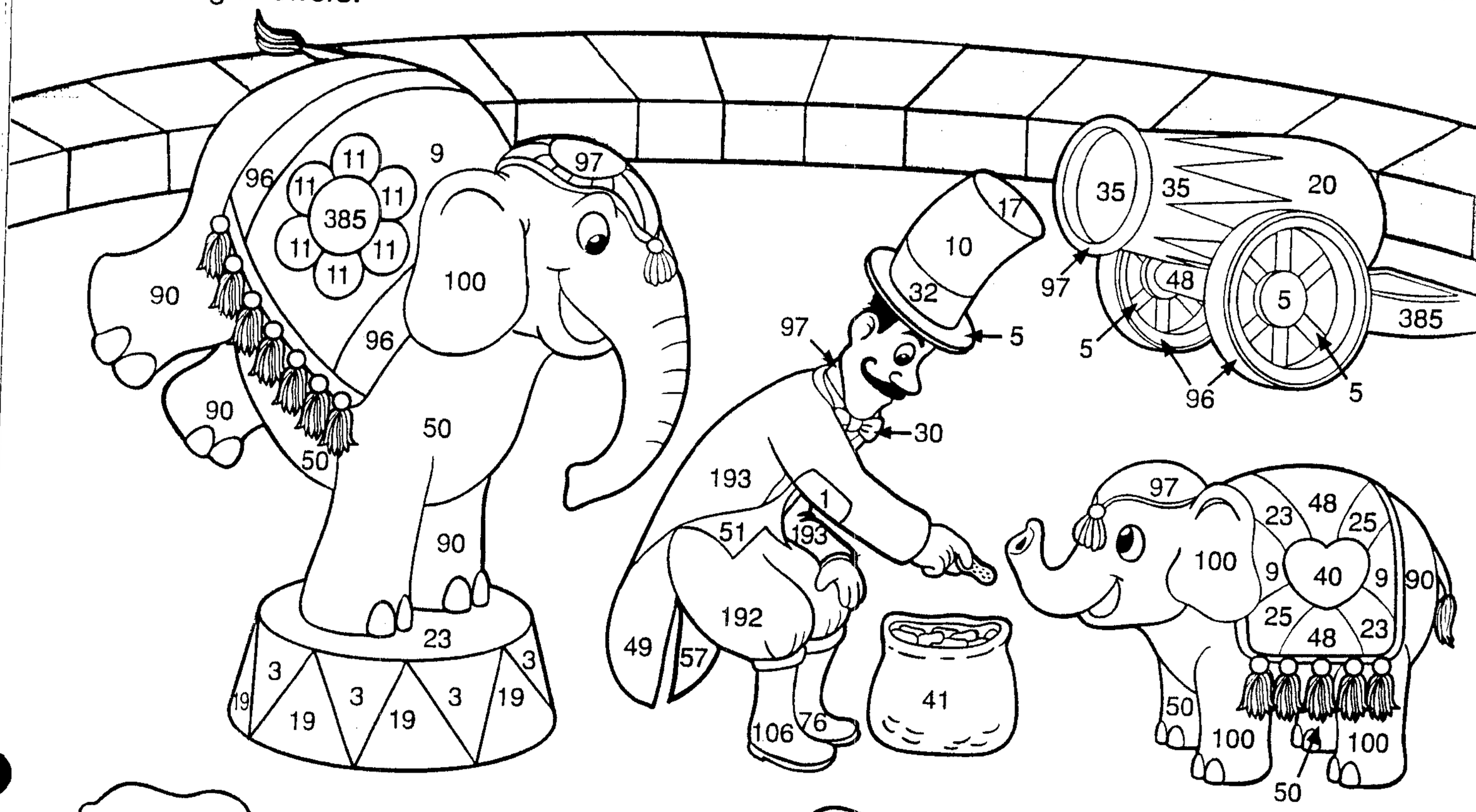
Bonus Box: If Timothy tinkers with the machine in Problem 2 so it does the same job in one step instead of two steps, what must he program it to do? Write your answer on the back of this page.

Name _____ 5.17

Identifying and extending patterns

Performing for Peanuts

Complete each pattern and write the rule. Then use the code to color the shape(s) labeled with the matching answers.



1. red 50, 40, 45, 35, ___, ___, ___

Rule: _____

2. blue 5, 7, 10, 14, ___, ___, ___

Rule: _____

3. yellow 47, 41, 35, 29, ___, ___, ___

Rule: _____

4. orange 729, 243, 81, 27, ___, ___, ___

Rule: _____

5. gray 20, 40, 30, 60, ___, ___, ___

Rule: _____

6. brown 9, 17, 25, 33, ___, ___, ___

Rule: _____

7. purple 7, 13, 25, 49, ___, ___, ___

Rule: _____

8. pink 320, 160, 80, 40, ___, ___, ___

Rule: _____

9. green 3, 6, 12, 24, ___, ___, ___

Rule: _____

10. black 1, 6, 16, 31, ___, ___, ___

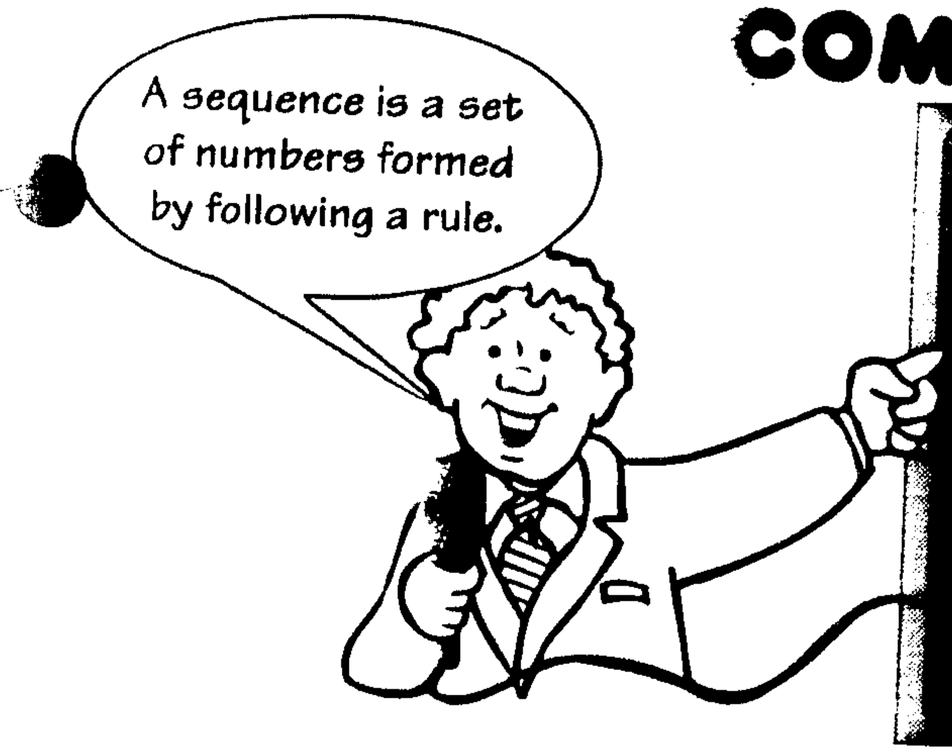
Rule: _____

Note to the teacher: Use alone or with "Pass the Pattern" on page 185.

Name _____ 5.17

Sequences

COMING UP NEXT...



- In an **arithmetic sequence**, you add or subtract the same number to find the next term.
  Example: 5, 8, 11, 14, 17,... (Add 3.)
- In a **geometric sequence**, you multiply or divide by the same number to find the next term.
  Example: 3, 6, 12, 24, 48,... (Multiply by 2.)
- Some are neither arithmetic nor geometric sequences. The terms follow each other according to a rule and form a pattern.
  Example: 2, 2, 4, 6, 10, 16,... (Add the two preceding terms to get the next term.)

4 _____/_____

Complete each sequence below by supplying the missing terms. Then write the rule for the pattern. Use the back of this page if you need more space. The first one has been done for you.

1. 6, 13, 20, 27, 34, 41,...
   Add 7.

2. 2, 6, _____, 54, 162, _____,...

3. 9, _____, 29, 39, _____, 59,...

4. 4; 20; 100; 500; _____; _____;...

5. 2, 7, 17, 22, 32, 37, _____, _____,...

6. $\frac{3}{4}$, _____, $\frac{27}{64}$, $\frac{81}{256}$, _____, $\frac{729}{4096}$,...

7. 1, 3, _____, 10, 15, _____,...

8. _____, 44, 66, 88, _____, _____,...

9. 2, 4, 4, 6, 6, 6, _____, _____, 8, _____,...

10. 4,000; 2000; _____; 500; _____;...

11. 12, 23, 34, 45, 56, _____, _____,...

12. 1; 6; 36; 216; _____; _____;...

13. 100, 10, _____, 20, 80, 30, 70, _____,...

14. 96, 48, 24, 12, _____, _____,...

15. $\frac{1}{2}$, $1\frac{1}{2}$, _____, 3, $3\frac{1}{2}$, _____, 5,...

16. 1, 5, 10, _____, 50, 1.00, _____,10.00,...

17. A, 1, Z, B, 2, Y, _____, _____, _____,...

18. 1, J, 2, F, 3, M, 4, A, _____, _____,...

19. 1.2, 2.6, 3.18, 4.54, 5.162, _____, _____,...

20. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, _____, $1\frac{1}{4}$, _____, $1\frac{3}{4}$ ...

Bonus Box: 3, 3, 5, 4, 4, 3, 5, 5, 4, _____. What number goes in the blank? Describe the pattern. (Hints: It is neither an arithmetic nor a geometric sequence. Write the number words for 1–10.)