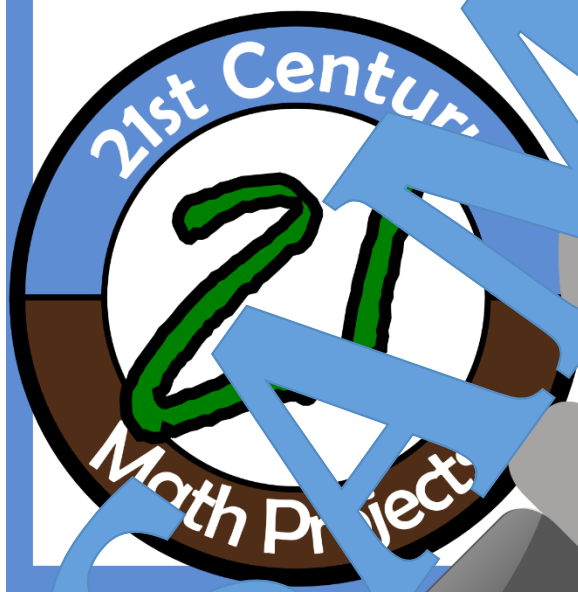


CSI: ELEMENTARY



UNIT 8 Input-Output Tables

Crime Scene Decoders Elementary: Input-Output Tables

Standard Focus: Algebra, Patterns and Functions

Time Range: 1-3 Days

Supplies: Pencil and Paper

Topics of Focus :

- Extending Patterns
- Defining Rules
- Connecting Graphs and Tables

Operations & Algebraic Thinking	4.OA.C.5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence; observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.
Operations & Algebraic Thinking	5.OA.B.3	Generate two numerical patterns following two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 1, and given the rule “Add 6” and the starting number 1, generate terms in the resulting sequences, and graph the ordered pairs. Explain informally why this is so.

Procedures:

- A.) Students will be given information from Chief Harris, the possible suspects, and crime scene puzzles.
 - B.) Students will work in pairs or small groups to solve the crime.
 - C.) Students will determine which suspect should be arrested.
 - D.) Students will create a portfolio of evidence proving that they have arrested the right person and will demonstrate their understanding of their mathematical content present in the problem.
- Extension, students can present their evidence to the class as an oral presentation.

Crime Scene Decoders Elementary: Input-Output Tables



Detectives,

This time, the international evil genius terrorist group, the Mathematicians, are causing problems all over the Middle East. Although we have apprehended a number of their criminals, we have not recovered any pieces of their world controlling device. From the clues we have gathered, the anonymous henchman, Anti Linetest, is the criminal behind these robberies.

A cryptic text message was sent to police, but requires the puzzles to be cracked. We've soon told the police that the cryptic text message will lead to Linetest's favorite number.



Thus far there are six suspects that police have questioned. You need to be prepared to state your case and demonstrate your understanding of the following skills that Linetest is known to use in the crimes.

- Extending Patterns
- Defining Rules
- Connecting Fractions and Decimals

Good luck!

Chief Harris



CRIME SCENE DECODERS: THE EVIDENCE



NAME: _____

1.	CLUE _____
2.	CLUE _____
3.	CLUE _____

SAMPLE



4.

CLUE

5.

CLUE

6.

CLUE

CRYPTIC TEXT MESSAGE

SUSPECT

SAMPLE

Who is Verti Linetest?



<p>Name: Tommy Occupation: Private Investigator Favorite Number: 7</p> 	<p>Name: Batulo Occupation: Student Favorite Number: 93</p> 
<p>Name: Marcy Occupation: Playwright Favorite Number: 12</p> 	<p>Name: Bao Occupation: Insurance Agent Favorite Number: 60</p> 
<p>Name: DeAndre Occupation: Business Owner Favorite Number: 12</p> 	<p>Name: Shabazz Occupation: Retired Favorite Number: 83</p> 

Scene #1 National Museum -- Tehran, Iran



Verti Linetest broke in and stole the tablet with the engraving of Hammurabi's Code. Police are not sure how the tablet will play into the World Conquering De

Welcome to the Middle East! This is where my conquest will begin!

Hammurabi's Code lays out the rules for society. How many of these tables are not following their rule?



TABLE A		TABLE B		TABLE C	
Rule: $y = x + 4$		Rule: $y = 2x + 4$		Rule: $y = 5x + 4$	
x	y	x	y	x	y
1	5	3	10	2	20
2	6	4	12	3	25
3	7	5	14	4	30
4	8	6	16	5	35
5	9	7	18	6	40

How many of these tables are not correct?

- 1 ⇒ **A = 1**
- 2 ⇒ **B = 2**
- 3 ⇒ **C = 3**

Scene #2 Dead Sea -- Amman, Jordan

Verti Linetest is suspected to have collected 400 liters of water and bacteria from the sea.



FISHING ON THE DEAD SEA

Every time they go fishing on the Dead Sea, Amare catches two times as many fish as Fatima plus three!

Complete the table and determine how many fish Amare will catch if Fatima catches 9 fish. This will be your next clue.

RULE:							
FATIMA	1	2	3	4	5	6	7
AMARE	5	7	9	11	13	15	17

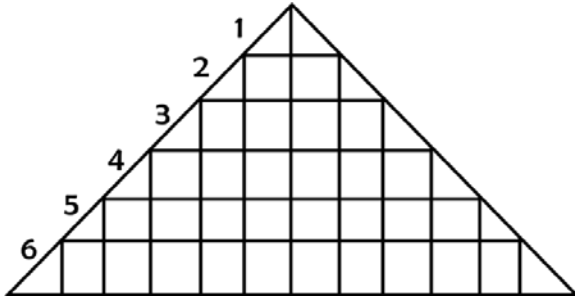
a = _____

Scene #3 Pyramids - Giza, Egypt



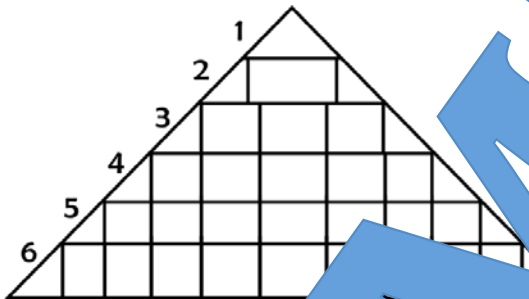
Etched into the ancient grounds of a pyramid, Verti Linetest left this note. Investigators suspect Verti Linetest stole the smallest pyramid at Giza.

HOW MANY TRIANGULAR AND RECTANGULAR BLOCKS DO I NEED IN EACH ROW FOR THE PYRAMIDS? WHAT ARE THE RULES FOR EACH PYRAMID?



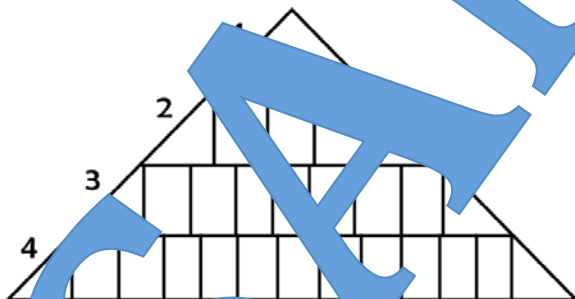
RULE:

ROW	BLOCKS



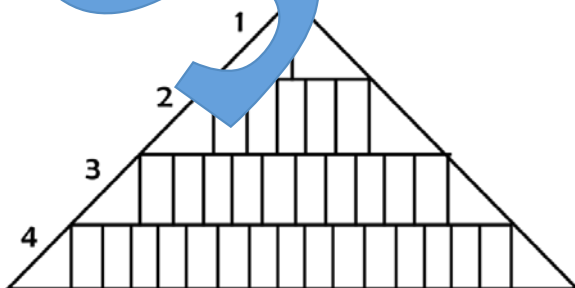
RULE:

ROW	BLOCKS



RULE:

ROW	BLOCKS



RULE:

ROW	BLOCKS

RULE BANK

USE THE BANK TO MATCH THE CORRECT RULE FOR EACH PYRAMID.

-- RULE A --
 $B = 4R - 3$

-- RULE B --
 $B = 2R$

-- RULE C --
 $B = 5R - 3$

-- RULE X --
 $B = 3R - 1$

-- RULE Y --
 $B = 2R - 1$

WHAT IS THE LETTER OF THE RULE THAT IS LEFTOVER?

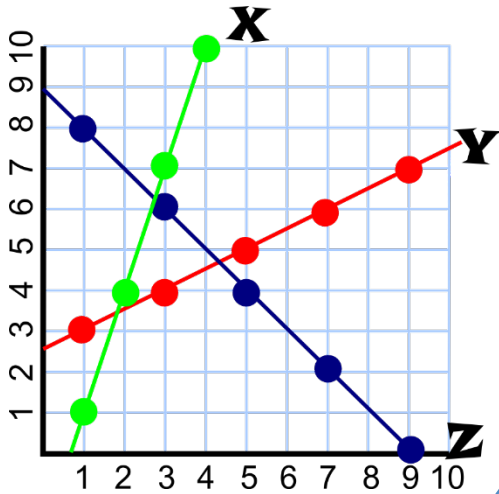
 = 5

Scene #4 Burj Khalifa -- Dubai, United Arab Emirates



After breaking into the Roman Museum, Verti Linetest escaped with a classic trebuchet and a truck load of stone boulders.

These are three possible paths of Dubai's world famous fireworks. Which line matches my data and what piece of data is missing from my table?



x	y
1	3
???	4
5	5
	6

Which line matches the data in the table? The value of x in the table will be equal to the y value.

$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$



Scene #5 Market -- Jerusalem, Israel

In the largest market in Israel, a suspect is suspected to have stolen all the silk.

To the Market

Before I conquered the world I decided to get a fruit basket for my mom! A basket with three pieces of fruit was \$17. A basket with six pieces of fruit was \$23. A basket with nine pieces of fruit is \$29.



Ruf	

Write the rule for the cost of the fruit basket. What would be the cost of the basket without any fruit? The answer to this question will be equal to Z.

$Z = \underline{\hspace{2cm}}$

Scene #6 Ancient Babylon -- Hillah, Iraq



Iraqis were stunned to discover that ancient Babylon was cut out of the ground and taken away by a helicopter. Later they were sent a cryptic text.



Welcome to Babylon!

Find the missing numbers in the sequences. Use these numbers together to find your final clue!

Oh wait! Did I tell you all of the sequences are written in Babylonian numerals? You will need this table for help.

	1	2	3	4	5	6	7	8	9	10
Babylonian										

SEQUENCE 1: , , , _____

SEQUENCE 2: , , , _____ ,

SEQUENCE 3: , , _____ , ,

What are the missing numbers of the sequence?

17



b=17

22



c=22

24



z=24

CRYPTIC PUZZLE SOLVER TEXT MESSAGE

Let the countdown begin. ~Verti

$$A + B + C - X - Y - Z$$

Thank you for being my Math Friend!

If you liked this

21st Century Math Project

You might like other... (Click the logo)



Math it Up.

Boondigggy.

Who is Verti Linetest?



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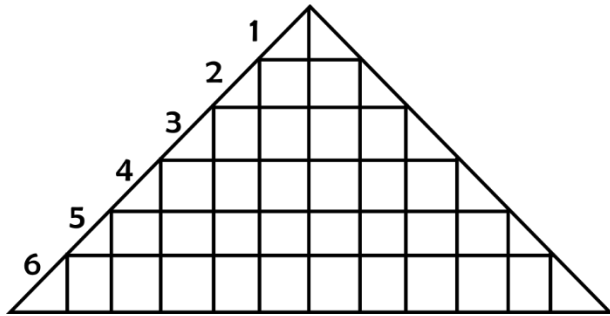
a = 21

Scene #3 Pyramids - Giza, Egypt



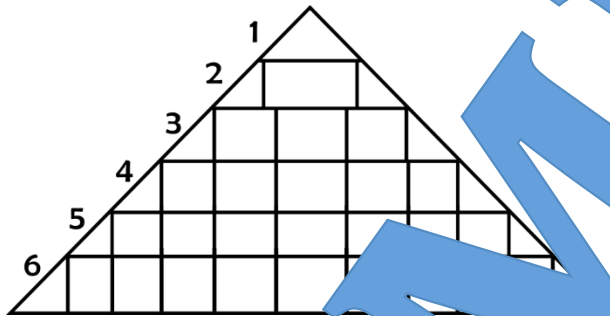
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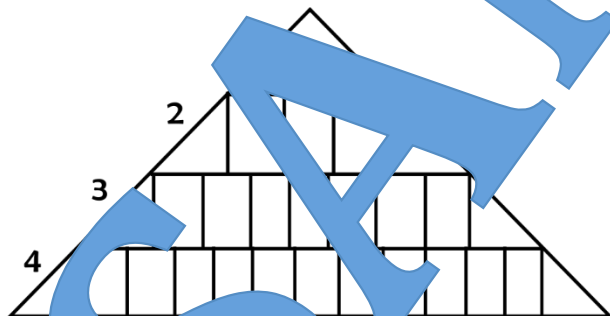
RULE:

ROW	BLOCKS



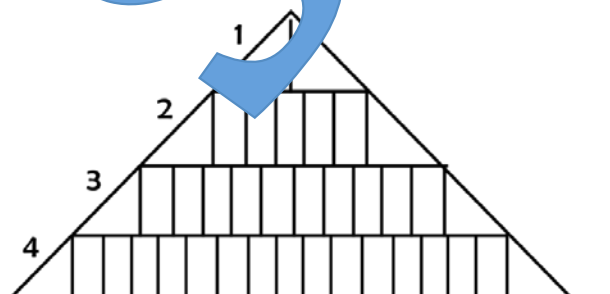
RULE:

ROW	BLOCKS



RULE:

ROW	BLOCKS



RULE:

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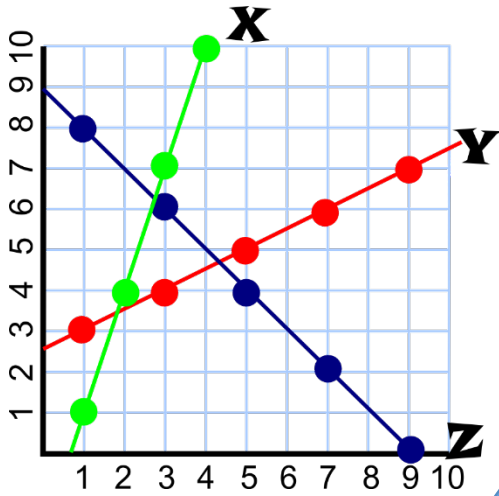
$$X = 5$$

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1	3
???	4
5	??
??	6

Which line matches the data in the table? The value of x in the table will be equal to the y -value.

Y = 3



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Before I conquered the world I decided to get a fruit basket for my mom! A basket with three pieces of fruit was \$17. A basket with six pieces of fruit was \$23. A basket with nine pieces of fruit is \$29.



$Rule: c = 2b + 11$

Write the rule for the cost of the fruit basket. What would be the cost of the basket without any fruit? The answer to this question will be equal to Z.

Z = 11

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Oh wait! Did I tell you all of the sequences are written in Babylonian numerals? You will need this table for help.

	1	2	3	4	5	6	7	8	9	10
Babylonian										

- SEQUENCE 1: , , , _____ 9
- SEQUENCE 2: , , , _____ , 7
- SEQUENCE 3: , , _____ , , 6

What are the missing numbers of the sequence?

17



b=17

22



c=22

24



z=24

CRYPTIC PUZZLE SOLVER TEXT MESSAGE

Let the countdown begin. ~Verti

$$A + B + C - X - Y - Z$$

$$(21) + (2) + (22) - (5) - (3) - (11) = 26$$