PATTERNS

AGENDA

Warm-Up

Set up Unit 2 Notes p.25

Grade Check

HW: #1-12

Reminders:

Test Corrections & Bathroom Passes due Wed

ESSENTIAL QUESTION

How do I find a pattern or sequence's function rule?

WARMUP MONDAY

State or draw the next term in each sequence or pattern:

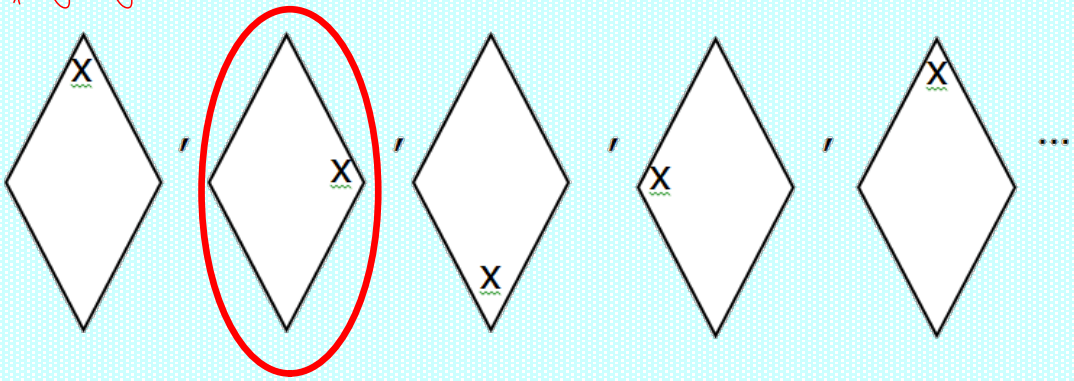
1. 4, 11, 18, ___25___

Add 7 each time

2. 4a, 8a, 16a, 32a, ___64a___

multiply by 2 each time

3.



UNIT 2

UNIT 2

TITLE: Foundations for Functions

Page #	Page Title
24	Words Worth Knowing
25	Patterns

p.23

On page 23 & 24, set up unit 2 in your notebook.

Put your "2" tab on page 23 (fold along the dotted line)

UNIT 2 Foundations for Functions

p.24

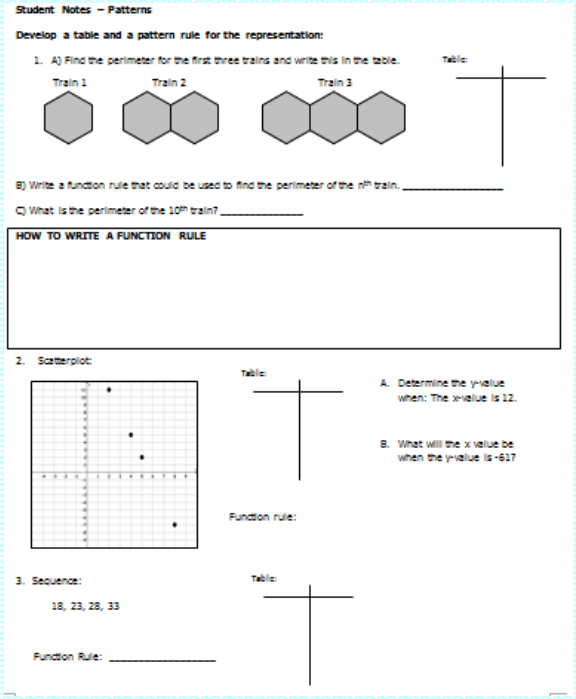
Words Worth Knowing

- Pattern
- Term (Position)
- Sequence
- Pattern Rule
- Scatterplot
- Function Rule
- Domain
- Range
- Ordered Pair
- Continuous Graph
- Discrete Graph
- Linear Parent Function
- Quadratic Parent Function
- Parabola
- CBR
- Distance vs. Time Graph
- Speed vs. Time Graph

PATTERNS P25

ESSENTIAL QUESTION How do I find a pattern or sequence's function rule?

Reminder: How do you glue in a 2-sided paper?



Student Notes – Patterns

Develop a table and a pattern rule for the representation:

1. A) Find the perimeter for the first three trains and write this in the table.

Train 1 Train 2 Train 3

Table:

B) Write a function rule that could be used to find the perimeter of the n^{th} train. _____

C) What is the perimeter of the 10^{th} train? _____

HOW TO WRITE A FUNCTION RULE

2. Scatterplot:

Table:

A. Determine the y-value when: The x-value is 12.

B. What will the x value be when the y-value is -61?

Function rule:

3. Sequence:

18, 23, 28, 33

Table:

Function Rule: _____

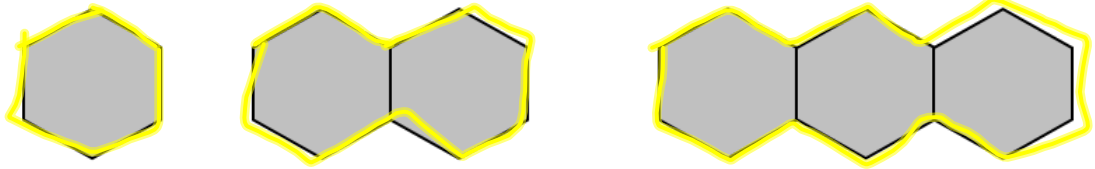
PATTERNS P2 5

ESSENTIAL QUESTION How do I find a pattern or sequence's function rule?

Develop a table and a pattern rule for the representation:

1. A) Find the perimeter for the first three trains and write this in the table.

Train 1 | Train 2 | Train 3



6 10 14

Table:

(Term) Train	Perimeter
1	6
2	10
3	14
n	

+1 +1 +4 +4

B) Write a function rule that could be used to find the perimeter of the n^{th} train. $P = 4n + 2$

C) What is the perimeter of the 10^{th} train? 42

$4(10)+2$

$6 = 4(1)+2$

$10 = 4(2)+2$

PATTERNS P2 5

ESSENTIAL QUESTION How do I find a pattern or sequence's function rule?

HOW TO WRITE A FUNCTION RULE

$y = (\text{rate of change})x + \text{beginning}$

- y: total (right column)
- rate of change: # when x goes up by 1, how does y change?
- x: term # (left column); multiply
- beginning: # what was y when x = 0?

PATTERNS P2 5

ESSENTIAL QUESTION How do I find a pattern or sequence's function rule?

2. Scatterplot:

graph w/ points plotted

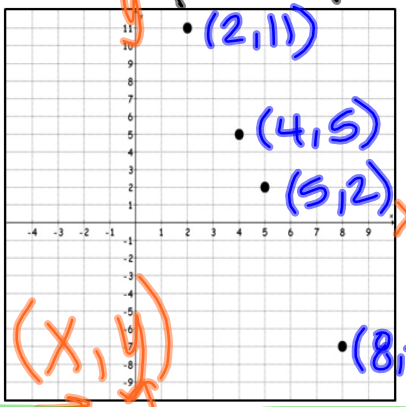


Table:

x	y
2	11
4	5
5	2
8	-7

Rate of change: -3

Function rule: $y = -3x + 17$

A. Determine the y-value when: The x-value is 12.

$y = -3(12) + 17$

-19

B. What will the x value be when the y-value is -61?

$-61 = -3x + 17$

$-17 \quad -17$

$-78 = -3x$

$\frac{-78}{-3} = \frac{-3x}{-3}$

$26 = x$

3. Sequence: set of #s that follow pattern

1 2 3 4

18, 23, 28, 33

Table:

x	y
1	18
2	23
3	28
4	33

Rate of change:

Function Rule: $y = 5x + 13$

Number your pattern (start w/ 1)

$18 = 5(1) + 13$

$18 = 5 + 13$

$23 = 5(2) + 13$

PATTERNS P25

ESSENTIAL QUESTION How do I find a pattern or sequence's function rule?

If *n* represents a number's position in a sequence, write the first 5 terms described by each expression. Plug into y= 2nd GRAPH x=1,2,3,4,5 change x to n

4. $3n+4$

n=1 → 3(1)+4
n=2 → 3(2)+4
⋮

7, 10, 13, 16, 19

X	Y1
1	7
2	10
3	13
4	16
5	19
6	22
7	25

Press + for ΔTbl

5. $n(n-1.5)+2$

X	Y1
0	2
1	1.5
2	3
3	6.5
4	12
5	19.5
6	29

X=0

6. A trai… of speed. The table below shows how far it travels in a given number of min… the table to determine how many miles the train will travel in 45 minutes and w…

Time in Minutes	5	10	15	20	45
Distance in Miles	5.75	11.5	17.25	23	

Function Rule: ________________

7. Given the function rule $y=6+2n$, what would be the term number if it took 110 blocks to build the pattern?

8. John delivers newspapers every morning in his neighborhood. He gets paid based on the number of hours, *x*, that he works. This table reflects John's pay scale.

Number of Hours Worked	Wages
1	$10
2	$18
3	$26
4	$34

+1 ; +8, +8, +8

Which equation represents the number of dollars, *w*, he will be paid for doing *x* hours of work?

A $w=2x+8$ B $w=10+8x$ C $w=34-8x$ D $w=2+8x$

X	A: Y1	B: Y1	C: Y1	D: Y1
1	10	18	26	10
2	12	26	18	18
3	14	34	10	26
4	16	42	2	34
5	18	50	-6	42
6	20	58	-14	50
7	22	66	-22	58

Press + for ΔTbl

Algebra I - Unit 2: Topic 1 – Patterns

Practice - Patterns **No Textbook Correlation**

Name _____ Date _____ Per _____

If *n* represents a number's position in a sequence, write the first 5 terms described by each expression.

1. $2n+7$

2. $n(n-6)+2$

Find the term number when it takes 103 blocks to build.

Match each sequence with its rule on the right.

3. -4, -3, -2, -1, 0

4. 6, 9, 14, 21, 30

5. 6, 7, 8, 9, 10

A $x+5$

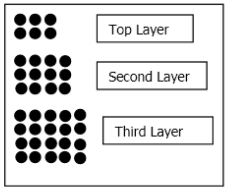
B $x-5$

C x^2+5

6. Pam needs to make a tower of soup cans as a display in a supermarket. Each layer of the tower will be in the shape of a rectangle as shown. The length and width of each layer will be one less than the layer below it.

A. How many cans will be needed for the fourth layer?

B. What is the total number of cans needed for an 8-layer tower?



7. Sara planted rows of tulips in her garden, as shown in the table. Which expression best shows the number of tulips per row, *r*.

Row Number	Number of Tulips
1	3
2	6
3	9
4	12

A. $3-r$

B. $r+3$

C. 3

D. $3r$

8. A geometry class was exploring the sum of the interior angles, *S*, of polygons as compared to the number of sides, *n*, that the polygon has. They recorded their data in the table below. Complete the table, and state the function rule.

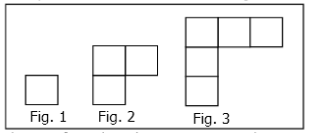
Function Rule: _____

n	S
3	180
4	360
5	540
6	720
7	
8	
9	

Algebra I - Unit 2: Topic 1 – Patterns

9. The top-count views of a block pattern are shown below. How many blocks does it take to build figure 10?

A 4
B 5
C 19
D 23



10. The figure below shows a partial view of Pascal's triangle. Which row of numbers best represents the seventh row in Pascal's triangle?

A 1 5 10 10 5 1

B 1 6 15 20 15 6 1

C 1 7 21 35 35 21 7 1

D 1 8 28 56 70 56 28 9 1

Pascal's Triangle

Row 1: 1
Row 2: 1 1
Row 3: 1 2 1
Row 4: 1 3 3 1
Row 5: 1 4 6 4 1

11. John delivers newspapers every morning in his neighborhood. He gets paid based on the number of hours, *x*, that he works. This table reflects John's pay scale.

Number of Hours Worked	Wages
1	$10
2	$18
3	$26
4	$34

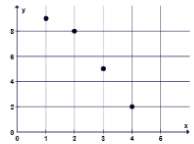
Which equation represents the number of dollars, *w*, he will be paid for doing *x* hours of work?

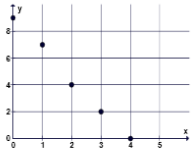
A $w = 2x + 8$
B $w = 10 + 8x$
C $w = 34 - 8x$
D $w = 2 + 8x$

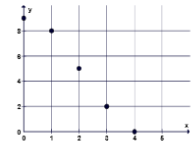
12. The table below shows how the weight of an ice cube changes as it melts in the sun.

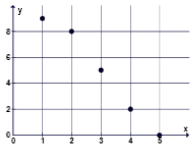
Time (min)	0	1	2	3	4
Weight (g)	9	8	5	2	0

Which graph below best represents the data in the table?

A


C


B


D


GRADE CHECK

This progress report does not have to be signed. This is the grade that will appear on your report card UNLESS: you complete test 2 corrections OR you turn in bathroom passes before 5PM Wednesday

If you see any issues, please highlight and turn the progress report back to the purple tray. (Stars do not hurt your grade)

Return papers: these papers are now yours to do what you wish with - except leave on my tables or floor.

HW CHECK: PATTERNS

1. 9,11, 13,15,17; Term: 48
2. -3, -6, -7, -6, -3
3. B
4. C
5. A
6. A. 30 cans
   B. OMIT
7. D
8. 18n - 360 (don't forget to fill in the table)
9. C
10. B
11. D
12. B