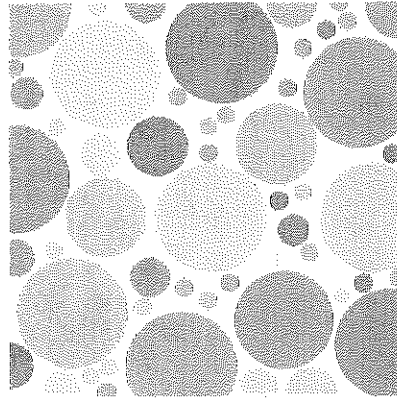


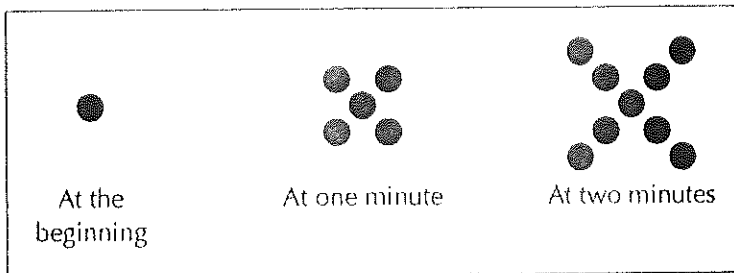
1.2 Growing Dots

A Develop Understanding Task



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1. Describe the pattern that you see in the sequence of figures above.
2. Assuming the pattern continues in the same way, how many dots are there at 3 minutes?
3. How many dots are there at 100 minutes?

4. How many dots are there at t minutes? Solve the problems by your preferred method. Your solution should indicate how many dots will be in the pattern at 3 minutes, 100 minutes, and t minutes. Be sure to show how your solution relates to the picture and how you arrived at your solution.

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Using function notation

To **evaluate** an equation such as $y = 5x + 1$ when given a specific value for x , replace the variable x with the given value and work the problem to find the value of y .

Example: Find y when $x = 2$. Replace x with 2. $y = 5(2) + 1 = 10 + 1 = 11$.

Therefore, $y = 11$ when $x = 2$. The point $(2, 11)$ is one solution to the equation $y = 5x + 1$. Instead of using x and y in an equation, mathematicians often write $f(n) = 5n + 1$ because it can give more information. With this notation, the direction to find $f(2)$, means to replace the value of n with 2 and work the problem to find $f(n)$. The point $(n, f(n))$ is in the same location on the graph as (x, y) , where n describes the location along the x -axis, and $f(n)$ is the height of the graph.

Given that $f(n) = 8n - 3$ and $g(n) = 3n - 10$, evaluate the following functions with the indicated values.

1. $f(5) =$

2. $g(5) =$

3. $f(-4) =$

4. $g(-4) =$

5. $f(0) =$

6. $g(0) =$

7. $f(1) =$

8. $g(1) =$

Topic: Looking for patterns of change

Complete each table by looking for the pattern.

9.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	2	4	8	16	32			

10.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	66	50	34	18				

11.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	160	80	40	20				

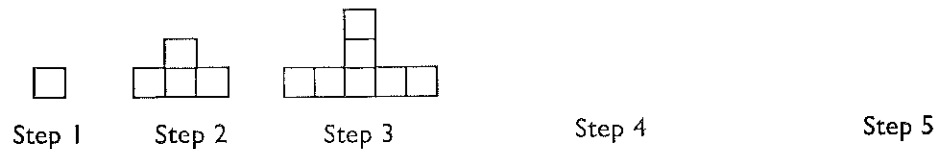
12.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	-9	-2	5	12				

SET

Topic: Use variables to create equations that connect with visual patterns.

In the pictures below, each square represents one tile.



13. Draw Step 4 and Step 5.

The students in a class were asked to find the number of tiles in a figure by describing how they saw the pattern of tiles changing at each step. Match each student's way of describing the pattern with the appropriate equation below. Note that " s " represents the step number and " n " represents the number of tiles.

(a) $n = (2s - 1) + (s - 1)$

(b) $n = 3s - 2$

(c) $n = s + 2(s - 1)$

14. ____ Dan explained that the middle "tower" is always the same as the step number. He also pointed out that the 2 arms on each side of the "tower" contain one less block than the step number.

15. ____ Sally counted the number of tiles at each step and made a table. She explained that the number of tiles in each figure was always 3 times the step number minus 2.

step number	1	2	3	4	5	6
number of tiles	1	4	7	10	13	16

16. ____ Nancy focused on the number of blocks in the base compared to the number of blocks above the base. She said the number of base blocks were the odd numbers starting at 1. And the number of tiles above the base followed the pattern 0, 1, 2, 3, 4. She organized her work in the table at the right.

Step number	# in base + #on top
1	1 + 0
2	3 + 1
3	5 + 2
4	7 + 3
5	9 + 4

GO

Topic: The meaning of an exponent

Write each expression using an exponent.

17. $6 \times 6 \times 6 \times 6 \times 6$

18. $4 \times 4 \times 4$

19. $15 \times 15 \times 15 \times 15$

20. $\frac{1}{3} \times \frac{1}{3}$

A) Write each expression in expanded form. B) Then calculate the value of the expression.

21. 7^1

22. 3^2

23. 5^3

24. 10^4

25. $7(2)^3$

26. $10(8^2)$

27. $3(5)^4$

28. $16\left(\frac{1}{2}\right)^3$