Name _____ Period _____ Date _____

8-4 TASKS

STEP BY STEP

Dan and Suzette collected data about how far they move from a starting point after each step. They both let n represent the number of steps taken and d represent the distance in meters from the start.

Dan's data is in the table to the right.

Dan's Step Data				
n	0	1	2	3
d	0	1.1	2.2	3.3

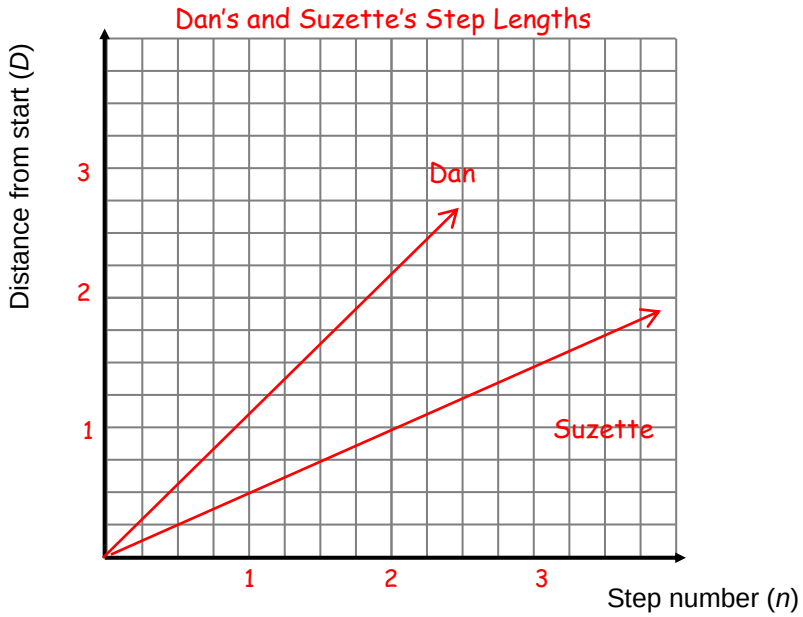
1. Do you think Dan's steps are big? Explain.
   Probably yes, since 1.1 meters is about 1 yard, which would be about the width of a typical classroom door.

2. Make a graph of Dan's data using the coordinate plane below. Make sure to title the graph and scale both axes appropriately.

3. Write an equation that represents Dan's data. $d = 1.1n$

Suzette found the following linear equation to model her data: $d = 0.5n$.

4. Include a graph of Suzette's equation on the coordinate plane below.



5. Who took bigger steps, Dan or Suzette? Defend your answer using evidence from above.
   Dan took bigger steps. Based on the equation, Suzette's step length was 0.5 m, less than half of Dan's step length. Dan covered more distance for any given time.

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GROWING SQUARES

This is a pattern of growing squares. All given lengths are in linear units and all given areas are in square units. Each small square in the pattern below is 1 square unit of area.

1. Continue the pattern for step 4.

Step # 1 2 3 4

2. Complete each table and write an input-output rule for each (a variable equation).

Table 1	
Step number (n)	Perimeter (P)
0	0
1	4
2	8
3	12
4	16
5	20
n	$4n$
Rule: $P =$ $4n$	

Table 2	
Step number (n)	Area (A)
0	0
1	1
2	4
3	9
4	16
5	25
n	n^2
Rule: $A =$ n^2	

3. If the perimeter is 84, find the step number. Show work.
   Step 21

4. If the step number is 20, find the area. Show work.
   400

5. Explain how the length of the side of a square is related to its perimeter.
   To get perimeter, add sides lengths together, or multiply side length by 4.

6. Explain how the length of the side of a square is related to its area.
   To get area, multiply length of side by itself, or square side length.

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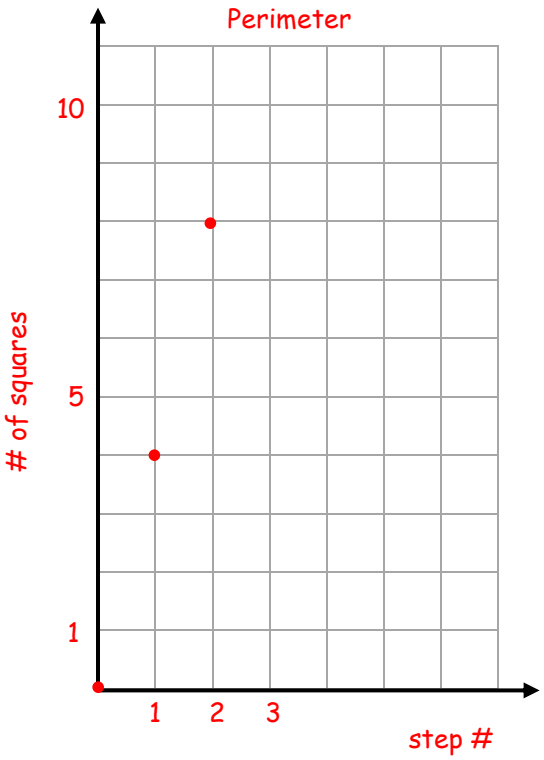
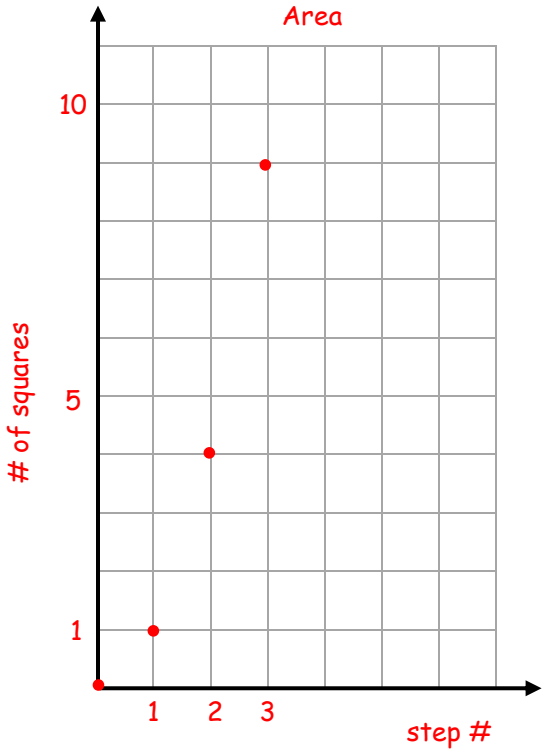
GROWING SQUARES
Continued

7. Create a complete graph for each table on the previous page.
   Trend lines may be drawn to stress linear relationships.





8. Does either graph represent a proportional relationship? Explain.
   The perimeter graph represents a proportional relationship because if points are connected they will be a line through the origin. The equation shows that *P* is a constant multiple of *n*. Entry pairs in the table are multiples of one another.

   The area graph is not. It is not a straight line through the origin. There is no common multiple for pairs of entries in the table.

9. Make at least two comparisons of the graphs.
   The graph for perimeter is a straight line. The graph for the area is a curve.
   The perimeter graph illustrates a proportional relationship. The area graph does not.
   Though they measure different kinds of units, the perimeter values are growing at a constant rate. The area values begin by growing at a lesser rate, but then eventually increase at a faster rate.