

Algebraic Thinking for All Students



NCTM 2017 San Antonio Texas Session #608

Susan Troutman

troutman@rice.edu

Director of Secondary Programs

Carolyn L. White

clwhite@rice.edu

Director of Elementary Programs

Rice University School Mathematics Project

Houston, Texas

<http://rusmp.rice.edu>





What would you choose?



Circle your choice:

- Choice A: 100 coins each day for 10 days
- Choice B: 5 coins and a magical pot that doubled the coins each day for 10 days

Justify your reasoning:

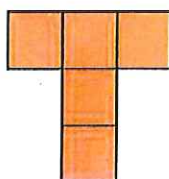
Final thought:

After working through the problem, would you still make the same choice? Why or why not?

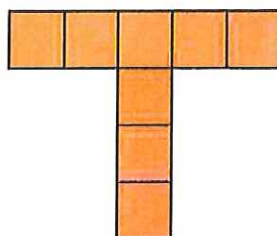
Name _____

Birthday Party Patterns

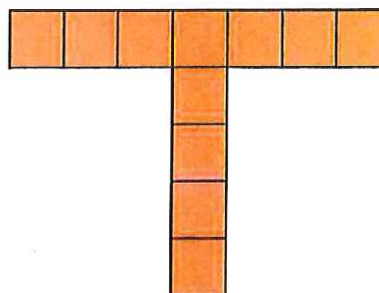
Tom wants to arrange the tables for his birthday party in the shape of a T, for Tom. He is trying to figure out how many tables he will need for different sizes of T's.



Arrangement 1



Arrangement 2



Arrangement 3

1. Without drawing or building, describe how to make the next arrangement of tables.

2. Use colored tiles to build arrangements 1–5. Explain how your arrangements show your answer to question 1.

3. Use your answers to questions 1 and 2 to complete the table to the right.

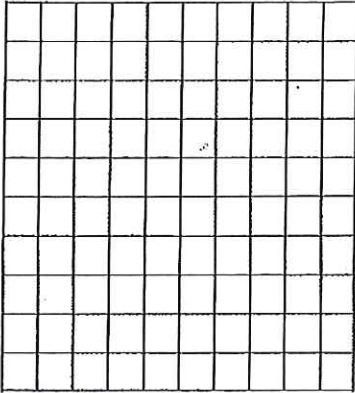
4. Without drawing or counting tables, how many tables will Tom need for arrangements 10, 15, and 50? _____

On the reverse side of this page, explain how you found your answers.

Arrangement	No. of tables
1	
2	
3	
4	
5	

Tiling a Patio

Patio Number	Number of Brown Tiles	Number of White Tiles	Total Number of Brown and White tiles

Graph 	Equation
Table	Solution

Bibliography

- Cuevas, G. J., & Yeatts, K. (2001). *Navigating through algebra in grades 3-5*. Reston, VA: National Council of Teachers of Mathematics.
- Cullen, C., & Gaymore, J. (2008). Ocean quest. *Teaching Children Mathematics*. Reston, VA: National Council of Teachers of Mathematics. 14(6), 344 - 351.
- Demi. (1997). *One grain of rice: A mathematical folktale*. New York: Scholastic Press.
- Driscoll, M., & Moyer, J. (2001). Algebraic thinking. *Mathematics Teaching in the Middle School* 6, (5), 282-287.
- Friel, S., Rachlin, S., Doyle, D., Nygard, C., Pugalee, D., & Ellis, M. (2001). *Navigating through algebra in grades 6-8*. Reston, VA: National Council of Teachers of Mathematics.
- Hong, L. T. (1993). *Two of everything*. Morton Grove, IL: Albert Whitman & Company.
- Moses, B. (Ed.). (2000). *Algebraic thinking, grades K-12: Readings from NCTM's school-based journals and other publications*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics (2000). *Principles and standards of school mathematics*. Reston, VA: Author.
- Suh, J. M. (2007). Developing algebra-rithmetic in the elementary grades. *Teaching Children Mathematics*. 14(4), 246-253.
- Switzer, J. M. (2016). Birthday party patterns. *Teaching Children Mathematics*. Reston, VA: National Council of Teachers of Mathematics. 22(6), 330-332.
- Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2010). *Elementary and middle school mathematics: Teaching developmentally*. Boston: Allyn & Bacon.