# NSF Math Column

Problem of the month

You're bored during math class, so you start doodling. You draw two lines L and M at a 45° angle. From a point on L a distance 1 away from the intersection, you draw a line perpendicular to line M. From that point, you draw a new line perpendicular to L. From there, you draw a line perpendicular to M. If you keep doing this forever, what would be the total length of the new lines (not including L and M)? Provide answer in a rationalized denominator form.
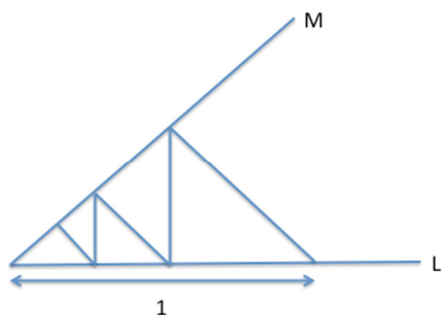
Would you like submit your answer? Please click on the following link:

Names of everybody who submitted correct answers will be published in the next edition!

Interested to know the solution for last column's problems? Refer to the end of this document!

For any questions or comments, please contact the team at NSFMathColumn@gmail.com

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Answer to Problem of the month (Vol 2-8)

1216

<u>Solution</u>:

Any 3-digit number "ABC" in base 12 can be written as $A.12^2 + B.12^1 + C.12^0$. Lowest such number has A = 1, B=0 and C=0. Hence total of numbers in base 12 that require 3 digits will be:
$12^2 <= n < 12^3$
$144 <= n < 1728$

Similarly for a number to have 4 digits in base 8, it should satisfy the following condition.
$8^3 <= n < 8^4$
$512 <= n < 4096$

Since both conditions have to be met, n should be between 512 and 1728 = 1728 – 512 = **1216**.

Who submitted correct answers?

- Anup Hiremath (Fremont, CA)
- Anirudh Kuchibhatla (Hyderabad, India)
- N Shankar (NJ)
- Tarang Saluja (Nashua, NH)
- Sashidhar Guduri (Ann Arbor, MI)
- Sathya Kovour (Algonquin, IL)
- Srihari Chelluri (Aldie, VA)
- Sankar Mahadevan (Dayton, NJ)
- Kavitha Shanmugam (Northville)
- Gita Balakrishnan (Sunnyvale, CA)
- Rakesh Gupta (Saratoga, CA)
- Shaan Bhandarkar (Potomac Falls, VA)
- Arvind Subramanian (Olathe, KS)
- Akshaj Kadaveru (Fairfax, VA)
- Narahari Bharadwaj (Berwyn, PA)
- Vamsi Subraveti (Nashville, TN)
- Ajit Kadaveru (Fairfax, VA)
- Marthes Solamuthu (UT)
- Shwetark Patel (Herndon, VA)

- Aayush Gupta Gupta (Saratoga, CA)
- Rahul Jayaraman (San Jose, CA)
- Nishanth Anand (Herndon, VA)
- Divya Goel (Bloomfield Hills, MI)
- Sushovan Guha (Missouri City, TX)
- Siddarth Guha (Missouri City, TX)
- Pranam Kalla (Simi Valley, CA)
- Mounisha Kovour (Algonquin, IL)
- Spoorthi Jakka (Naperville, IL)
- Hemanth Chitti (Bangalore, India)
- Anupam Sharma (FAIRFAX)
- Desigamoorthy Nainar (Champaign, IL)
- Anish Chaluvadi (Simpsonville, SC)
- Anjali Nambrath (Marlboro, NJ)
- Anitha Ramakodi (Parsippany, NJ)
- Suganth Kannan (Weston, FL)
- Anudeep Udumula (Bear, DE)
- Rama devi kodali (Cary, NC)
- Rohith Sai Edupuganti (Cary, NC)
- Srivani Edupuganti (Cary, NC)
- Ritik Goyal (Austin, TX)
- A Thakkar (Naperville, IL)
- Pranay Malempati (Newark, DE)
- Dhivya Senthil Murugan (Denver, CO)
- Neha Khandelwal (FAIRFAX)
- Sreekar Chitti (Bangalore, India)
- VIJAYA MADALA (CHANTILLY, VA)
- mrugank gandhi (Aurora, IL)
- Sarat Kotthakota (Austin, TX)
- Rahul Madala (Chantilly, VA)

Thanks to all who attempted to solve the problem of the month. We look forward to your continued interest and increased participation!