

# NSF Math Column



## Problem of the month

A merchant has a balance to measure the weight of objects. He has a 100 lb stone and he wants to break the stone into pieces which can help him measure the weight of any other object ranging from 1lb to 100 lb to the nearest integer with the help of the balance and the pieces. He realizes that he has to pay \$1 to the stone cutter who breaks into two pieces with the weight of each piece (an integer) specified by the merchant. What is the minimum amount of money the merchant must spend so that he can measure any (integer) weight from 1lb to 100 lb with the help of broken pieces of stone?

Would you like submit your answer? Please click on the following link:

<https://spreadsheets.google.com/viewform?formkey=dHR6ek5BazVnRVM3d01nbG1fNVdybXc6MA>

***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!***



***Special thanks to the following Math Column contributors:***

- ***Swaroop Darbha***

***For any questions or comments, please contact the team at [NSFMathColumn@gmail.com](mailto:NSFMathColumn@gmail.com)***

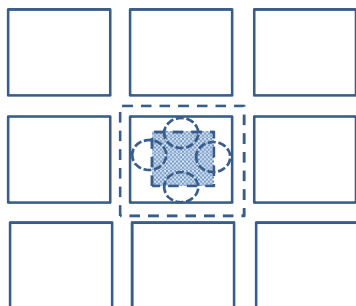
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## Answer to Problem of the month (Vol 2-2)

$\frac{1}{4}$  or 25%

**Solution (Source: AoPS):**

Let's take a look a segment of the net as shown below.



For calculating the probability of an event, we need to know two things – Total number of favorable outcomes and the total number of possible outcomes. In this case, favorable outcome is any area of the square hole where the bullet won't touch the net. Since the bullet has a radius of 1 mm, it has to be at least 1 mm inside the square hole from its edges. This is shown by the smaller shaded square. This area is  $9 \text{ mm}^2$ . Now, to find the total possible area we look at the dotted square. Since the thickness of the wire between the squares is 1 mm, we consider only 0.5 mm of the wire as part of the square under consideration. The other half belongs to the adjacent square on all four sides as shown. Thus the area of the possible region is  $36 \text{ mm}^2$ . Hence the probability for the bullet to go through the square without touching the wires is  $9/36 = \frac{1}{4}$ . The same will be true for any square hole in the net.



## Who submitted correct answers?

- Akshaj Kadaveru (Fairfax, VA)
- Harish Verma (San Jose, CA)
- Sankar Mahadevan (Dayton, NJ)
- Ajit Kadaveru (Fairfax, VA)
- Adityagautham Sezhian (Painted Post, NY)
- Rakesh Gupta (Saratoga)
- Shalini Dangi (Mission Viejo)
- Anirudh Vustepalli (Orlando, FL)
- Meena Shankar (Bridgewater, NJ)
- Aayush Gupta (Saratoga)
- Anurag Dhawan (San Jose, CA)
- Shwetark Patel (Herndon, VA)
- Rithik Endlur (MD)
- Varun Vepa (Urbandale, IA)
- Siddarth Guha (Missouri City, TX)
- Sushovan Guha (Missouri City, TX)
- Shivani Guha (Missouri City, TX)
- Sarmistha Majumdar (Missouri City, TX)
- vijaya madala (Chantilly, VA)
- Shaan Bhandarkar (Potomac Falls)
- Gaurav Hardykar (Princeton, NJ)
- Tanushree Pal (Ventura, CA)
- Mahathi Allepally (Issaquah, WA)
- Anupam Sharma (Haymarket)
- Desigamoorthy Nainar (Champaign, IL)
- Tarang Saluja (Nashua, NH)
- Anudeep Udumula (Bear, DE)
- Savan Kumar (LAWRENCE)
- Rohan Balel (Buffalo Grove, IL)
- Venkatesh Madapoosi (Grover, MO)
- Suganth Kannan (Weston, FL)
- Meghana Gudavalli (Franklin Park, NJ)
- Rama devi kodali (Cary, NC)
- Mythri Challa (Coralville, IA)
- Kannan Nagarajan (Weston, FL)
- Gowri Anupama (Sunnyvale, CA)
- Avinash Madala (Pembroke Pines)
- Meyyappan Meyyappan (TYNGSBORO)
- Rekha Chandak (Dallas, TX)
- Varsha Madapoosi (Wildwood, MO)
- Yash Chandak (Dallas, TX)
- Dhivya Senthil Murugan (Denver, CO)
- Nithin Gudavalli (Franklin park, NJ)

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- Anirudh Kuchibhatla (Hyderabad, India)
- Neha Khandelwal (Haymarket, VA)
- Anitha Ramakodi (Parsippany, NJ)
- Rahul Madala (Chantilly, VA)
- Anish Madala (Chantilly, VA)
- Subahni Rajiv (LA)
- Gayathri srirajan (Waukegan)
- Harshini Somisetty (Columbus, OH)
- praneeth prathi (Shrewsbury, MA)
- Anjali Nambrath (Marlboro, NJ)
- Shritha Gunturu (Aurora, CO)
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- Arunandhi Rathinam (Rochester Hills, MI)
- Ritika Revoori (Sharon, MA)
- Rithu Uppalapati (Commerce, MI)
- Aditya Vargheese (Overland Park, KS)
- Mrugank Gandhi (Aurora, IL)
- Indumathi Prakash (Sharon, MA)
- Sounak Dey (Columbus, OH)
- Himanvi Kopuri (Denver, CO)
- Raja Saladi (Campbell, CA)

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