

NSF Math Column



Problem of the month

A house catches fire and the home owner dials the emergency number for help. A fire station is located 6 KM east and 5 KM south of the house. The fire truck needs to fill water from a river that is 3 KM south of the fire station before reaching the house to put off the fire. At a speed of 100 KM/h, how quick can the fire truck get to the house if it takes 5 minutes to fill water at the river? (Round your answer to the nearest whole number)

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!

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

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Answer to Problem of the month (Vol 2-3)

\$4

Solution:

Let's assume the stone is cut into M pieces with weights W_1, W_2, \dots, W_M . In measuring the weight of any other object using these pieces, each of these pieces can be either placed on the right-side of the balance or left-side of the balance or not used. If we use numbers 1, 2, and 0 to represent these three options respectively, then the maximum number of distinct objects whose weight can be measured is like listing all possible ternary numbers – $(3^M - 1)$ possible options not including the option where none of the pieces are used.

In addition, the objects can be switched from left to right and vice-versa leaving us with – $(3^M - 1)/2$ total possibilities. Now, if we need to be able to measure any object weighing from 1 to 100 lb, the following condition must be true.

$$(3^M - 1)/2 \geq 100$$

$$(3^M - 1) \geq 200$$

$$3^M \geq 201$$

Therefore, M must be at least 5 and to get the 5 pieces, 4 cuts are required and hence the minimum cost is \$4.



Who submitted correct answers?

- Aditya Bhaskar (Pleasanton, CA)
- Akshaj Kadaveru(Fairfax, VA)
- shaan bhandarkar(Potomac Falls, VA)
- Aayush Gupta(Saratoga, CA)
- Rakesh Gupta(Saratoga, CA)
- Varsha Madapoosi(GROVER, MO)
- Shabad Washist(Overland Park, KS)
- Gowri Anupama(Sunnyvale, CA)
- Rishet Nair(Marlton, NJ)
- Shweta Nair(Marlton, NJ)
- Meena Shankar(Bridgewater, NJ)
- Sankar Mahadevan(Dayton, NJ)
- venkatesh madapoosi(Grover, MO)
- N Shankar (NJ)
- Bhavani Sankaralingam(Dayton, NJ)
- Ananth Sankaralingam(Dayton, NJ)
- Rama devi kodali(Cary, NC)
- ARCHANA CHAUDHARI(CARY, NC)
- Anika Ramachandran(Cupertino, CA)
- Himanvi Kopuri(Denver, CO)
- Rithvik Garimella(Canton, MI)
- Disha Hegde(Plainsboro, NJ)
- Srivani Edupuganti(Cary, NC)
- Rohith Edupuganti(Cary, NC)
- Savan Kumar (LAWRENCE)
- Anurag Dhawan(San Jose, CA)
- Pranam Kalla(Simi Valley, CA)
- Ajit Kadaveru(Fairfax, VA)
- Akshay Prabhushankar(Olathe, KS)
- Chandrasekhar Sundar Rajan (TX)
- Anmol mittal(Tampa, FL)
- Sreekar Chitti(Bangalore, India)
- Suganth Kannan(Weston, FL)
- Kannan Nagarajab(Weston, FL)
- Rekha Kannan(Weston, FL)
- Anirudh Kuchibhatla(Hyderabad, India)
- Shivang Jadvani(West Palm Beach, FL)
- Arvind Navada(Rockville, MD)
- Arvind Navada(Rockville, MD)
- Anjali Gupta(Edison, NJ)
- yash chandak(Dallas, TX)
- Shruthi Santhanam(Suwanee, GA)
- Desigamoorthy Nainar(Champaign, IL)

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- Harini Shanmugam(Shrewsbury, MA)
- Gayathri srirajan (Waukegan)
- Anirudh Udutha(Atlanta, GA)
- Tanushree Pal(Ventura, CA)
- Sridhar Guduri(New Albany, OH)
- Nithin Gudavalli(Franklin park NJ)
- Wesley Kinney(Wilmington, NC)
- Gaurav Hardykar(Princeton, NJ)
- Aditya Hardykar(Princeton, NJ)
- Siddarth Guha(Missouri City, TX)
- Sushovan Guha(Missouri City, TX)
- Ramanan Srirajan(Waukegan, IL)
- Shivani Guha(Missouri City, TX)
- Sarmistha Majumdar(Missouri City, TX)
- Rekha Chandak(Dallas, TX)
- Dhivya Senthil Murugan(Denver, CO)
- Mrugank Gandhi(Aurora, IL)
- Shritha Gunturu(Aurora, CO)
- Shreyaa Raghavan(Sharon, MA)
- Meghana Gudavalli(Franklin park, NJ)
- Maya Shankar(Bridgewater, NJ)
- Aditya Vargheese(Overland Park, KS)
- Mounisha Kovour(Algonquin, IL)
- Anju Garg (NJ)
- Monal Garg (NJ)
- Lalitha Chamarajan(Mount Laurel, NJ)
- Prathi Govind(Wildwood, MO)
- Anitha Ramakodi(Parsippany, NJ)
- Kishan Bava(Parsippany, NJ)
- Geetha Muppala(Gilberts, IL)
- Chandana Kandru(Monmouth Junction, NJ)
- Eesh Chalasani (KY)
- Tharini Ramakrishnan (Beaverton, OR)
- Aparna Kumar (Morganville)
- surya Jaladi(St Louis, MO)
- Harshini Somisetty(Columbus, OH)
- Viknesh Baskar(Rochester, NY)
- Keerti Vajrara(Aurora, CO)
- Tarang Saluja(Nashua, NH)
- yash nalla(Concord, NC)
- Sashidhar Guduri(Ann Arbor, MI)
- Indumathi Prakash(Sharon, MA)
- Varsha Siri(Plano, TX)
- Pranav Upadhyayula(Plainfield, IL)
- Keshav Mallidi(Roanoke, VA)
- Bhargav Mallidi(Roanoke, VA)
- Roshan George(Charlottesville, VA)
- Geetanjali Khanna(Piscataway, NJ)
- Anirban Datta (CA)
- Deepankar Gupta(Naperville, IL)
- Sanjana Kothuri(Cupertino, CA)
- Rahul Reddy(Marlton, NJ)
- Sounak Dey(Columbus, OH)
- mahati malladi(Fairfax, VA)
- Sundar Sankaran(Voorhees, NJ)
- hemanth chitti(Bangalore, India)
- Ankit Bhatia (San Diego, CA)

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