

NSF Math Column



Problem of the month

John volunteers to help in the relocation of his school library from the East block to the North block. He is assigned the section where there are Science books. He decides to move the smallest possible number of books that is more than half the number of remaining books in a day. For example, if there are 100 books, he would move 51 books (one more than half). If John was able to move the books in 10 days and to his surprise he always ended up with an even number of remaining books to move, what is the least possible number of books he could have started with if there were at least 1000 Science books?

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!

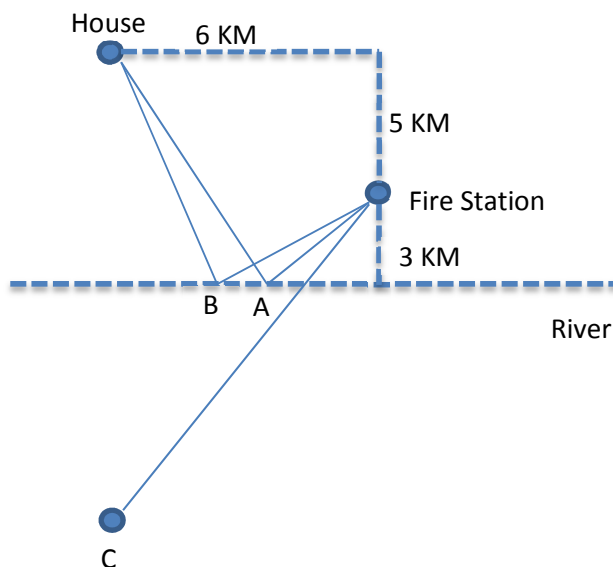
For any questions or comments, please contact the team at NSFMathColumn@gmail.com

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Answer to Problem of the month (Vol 2-4)

13 minutes

Solution:



Basically, we need to find the shortest distance from the Fire Station to the House including filling of water from the river. Based on the above figure, the fire truck can fill water at any point from the river. For example, points A and B are two such points. There are several such points but the requirement is that the sum of distances from Fire Station to the point on the river and from the point on the river to the house must be the shortest. Easiest way to solve such a problem is to draw the reflection of the House across the river as shown by Point C above. Now, the problem reduces to finding the length of the straight line connecting the Fire Station and the Point C. Using Pythagoras theorem, we can calculate that to be $\sqrt{(11^2 + 6^2)} = \sqrt{(121 + 36)} = \sqrt{157}$ KM. At the speed of 100 KM/h, the fire truck would take $(\sqrt{157})/100$ hours or $(\sqrt{157}) * 60/100$ minutes = 8 minutes (rounded). Including the 5 minutes for filling the water, total time taken will be 13 minutes.



Who submitted correct answers?

- Aayush Gupta (Saratoga, CA)
- Akshaj Kadaveru (Fairfax, VA)
- Ajit Kadaveru (Fairfax, VA)
- Tarang Saluja (Nashua, NH)
- sankar gopalkrishna (Scarsdale, NY)
- Sankar Mahadevan (Dayton, NJ)
- SaShank Bikkasani (Tampa, FL)
- Sathya Kovour (Algonquin, IL)
- Shaan Bhandarkar (Potomac Falls, VA)
- Disha Hegde (Plainsboro, NJ)
- Shaleen Agrawal (Champaign, IL)
- Shivani Senguttuvan (Champaign, IL)
- Sashidhar Guduri (Ann Arbor, MI)
- Rahul Reddy (Marlton, NJ)
- Chandana Kandru Monmouth Junction
- Mounisha Kovour (Algonquin, IL)
- Arvind Subramanian (Olathe, KS)
- Kannan Nagarajan (Weston, FL)
- Suganth Kannan (Weston, FL)
- Kevin John (Tampa, FL)
- Arvind Navada (Rockville, MD)
- Subashni Rajiv (L.A.)
- Bharath Mohan (Simi Valley, CA)
- Shwetark Patel (Herndon, VA)
- Tameem syed (Caledonia)
- Aditi Patil (Melville, NY)
- anup hiremath (Fremont, CA)
- AMRITA ADAK (Providence, RI)
- Neha Khandelwal (Haymarket, VA)
- Anupam Sharma (Haymarket, VA)
- preetham bachina (Pleasanton, CA)
- Aditya Vargheese (Overland Park, KS)
- Sanjna Khanna (Piscataway, NJ)
- ANKIT BHATIA (San Diego, CA)
- AVINASH MADALA (PEMBROKE PINES)
- Serena behera (Farmington, MI)
- Neha Prasad (Nashua, NH)
- Shiv Udutha (Atlanta, GA)

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- rekha chandak (Dallas, TX)
- Rithvik Garimella (Canton, MI)
- Annanya Bhaskar (Pleasanton, CA)
- Aditya Bhaskar (Pleasanton, CA)
- rani mundada (VA)
- Siddarth Guha (Missouri City, TX)
- Sushovan Guha (Missouri City, TX)
- Shivani Guha (Missouri City, TX)
- Sarmistha Majumdar (Missouri City, TX)
- Desigamoorthy Nainar (Champaign, IL)
- Rohith Edupuganti (Cary, NC)
- N Shankar (Bridgewater, NJ)
- Anurag Dhawan (San Jose, CA)
- Anju Garg (NJ)
- Mahima Parupalli (Tampa, FL)
- Shritha Gunturu (Aurora, CO)
- Shravya Arra (Sugar Land, TX)
- Srivani Edupuganti (Cary, NC)
- Rama devi Kodali (Cary, NC)
- Kiran Nariseti (Columbus, OH)
- Hemanth Chitti (Bangalore, India)
- Anirudh Kuchibhatla (Hyderabad, India)
- Ritika Shrivastav (VA)
- ritesh shrivastav (VA)
- Gowri Anupama (Sunnyvale, CA)
- Mahati Malladi (Fairfax, VA)
- yash nalla (Concord, NC)
- Sunita Surapaneni (Cary, NC)
- Vanitha Sankaranarayanan (Walnut Creek, CA)
- Himanvi Kopuri (Denver, CO)
- Shreyaa Raghavan (Sharon, MA)
- Nithish Baba (Cherry Hill, NJ)
- Tarun Kumar (Plano TX)
- Pavani Samala (West Chester)
- Keerti Vajrala (Aurora, CO)
- Pranam Kalla (Simi Valley, CA)
- Ankit Patel (Princeton, NJ)
- Mythri Challa (Coralville, IA)
- Monal Garg (East Brunswick, NJ)
- Shruthi Santhanam (Suwanee, GA)
- Sreekar Chitti (Bangalore, India)
- Anitha Ramakodi (Parsippany, NJ)
- Meghana Gudavalli (Franklin Park, NJ)
- Nithin Gudavalli (Franklin Park, NJ)
- Anudeep Udumula (Bear, DE)
- Indumathi Prakash (Sharon, MA)
- Shweta Nair (Marlton, NJ)
- Anita Patel (Princeton, NJ)
- Aparna Kumar (Morganville, NJ)
- Risheet Nair (Marlton, NJ)
- Sachin Raghavendran (Cary, NC)
- Gayathri Srirajan (Waukegan)
- Aravind Kuchibhatla (Hyderabad, India)
- Sirisha Munukutla (Saratoga, CA)
- Mrugank Gandhi (Aurora, IL)
- Yash Chandak (Irving, TX)
- Rishika Suraparaju (Gilberts, IL)
- Pranav Arrepu (Concord, NC)
- Shravani Samala (West Chester, PA)
- Ravikiran Komirisetty (Irvine, VA)
- Sushil Upadhyayula (Naperville, IL)
- venkatesh madapoosi (Grover, MO)
- A Thakkar (Naperville, IL)
- Harini Shanmugam (Shrewsbury, MA)
- Savan Kumar (LAWRENCE)
- Dhivya Senthil Murugan (Denver, CO)
- Praneeth Prathi (Shrewsbury, MA)
- dhanush parasa (Gaithersburg, MD)
- Anjali Nambrath (Marlboro, NJ)
- Uma Reddy (Irvine, CA)
- Varun Ravichandran (Caldwell, NJ)
- Shabad Washist (Overland Park, KS)
- Lalitha Iyer (Indiana)
- VIJAYA MADALA (Chantilly, VA)
- Suma Ejantkar (Auburn, AL)
- lakshay maharana (Sunnyvale, CA)
- Sayuj Shajith (Suwanee, GA)
- Anusha Vajrala (Aurora, CO)
- Vinay Panayanchery (Moorestown, NJ)
- Lalitha Chamarajan (Mount Laurel, NJ)
- Swetha Mulukutla (Cincinnati, OH)
- Meena Venkat (westlake village)
- surya Jaladi (St Louis, MO)
- Meghana Annambhotla (Southbury, CT)
- Sonali Razdan (Shrewsbury, MA)
- ARCHANA CHAUDHARI (CARY, NC)
- Srujan Gubbi (Commerce Twp, MI)
- Samika Kanekar (Hershey, PA)
- Anish Madala (Chantilly, VA)
- Jay Gurralla (San antonio, TX)
- Rahul Razdan (Shrewsbury, MA)

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- Rahul Madala (Chantilly, VA)
- Abhay Ram (IL)
- Harshini Somisetty (Columbus, OH)
- Kavitha Balakrishnan (MA)
- Nikhil pandeti (Weymouth, MA)
- Anjali Gupta (Edison, NJ)
- Pranav Upadhyayula (Plainfield, IL)
- Tharini Ramakrishnan (Portland, OR)
- pranav narnur (Suwanee, GA)
- Manasa Lakshmi Narasimhan (Long Beach, CA)

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