

Texas A&M University - Department of Mathematics
Math Fair Contest - April 20, 2013
Grades 5 - 6

Problem 1. What number should come next in the list 5, 4, 6, 3, 7, 2, 8, ...?

Problem 2. Calculate $\frac{2}{3} \times \frac{3}{4} - \frac{1}{5}$. (Give the answer as a fraction in reduced form.)

Problem 3. What is the sum of all numbers from 1 to 20?

Problem 4. There are only two prime numbers between 1 and 50 that have sum of digits equal to 10. What is their difference?

Problem 5. Express $\frac{17}{13}$ as a decimal number rounded to three decimal places.

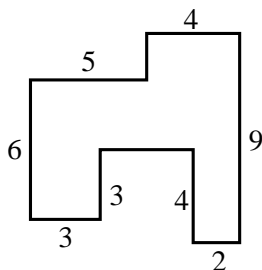
Problem 6. What is the greatest common factor of 90 and 126?

Problem 7. What is the largest possible number that is smaller than 4000 and can be written by using each of the digits 2, 3, 5, and 6 exactly once?

Problem 8. In some intermediate school 35 percent of the students are walkers. How many students attend the school if it is known that there are 140 walkers?

Problem 9. I have some number of chocolates, my sister has twice as many as I have, and our friend has twice as many chocolates as my sister does. Altogether the three of us have 21 chocolates. How many chocolates does my sister have?

Problem 10. What is the perimeter of the following figure (the length of some of the sides is indicated with a number; all angles are right angles)?



Problem 11. What is the area of the figure in the previous problem?

Problem 12. A bag contains 6 white and 4 maroon balls. Jessica draws balls at random from the bag (she does not return the balls once she draws them) and she stops as soon as she draws a maroon ball. What is the probability that she stops immediately after the third draw? (You can leave the answer as a fraction without reducing it.)

Problem 13. Jane wrote all numbers from 1 to 150 on the board. What is the total number of digits she used to write all those numbers?

Problem 14. Bob and Sheila started playing their drums by making a sound, each on his/her own drum at the same moment. After that Bob made a sound on his drum every two seconds, while Sheila made a sound on her own drum every 3 seconds. How many sounds of a drum did their mother hear in the first 15 seconds of their playing? Note that, when Bob and Sheila hit their drums at the same time their mother hears only one sound.

Problem 15. In a certain intermediate school, fifth graders that are in the orchestra practice their instruments an average of 30 minutes per day, and sixth graders practice an average of 45 minutes per day. If there are 60 fifth graders and 40 sixth graders in the orchestra, what is the average number of minutes per day that the students in the orchestra practice?

Problem 16. Let A be the number obtained by multiplying all numbers from 1 to 25. The number A ends in several zero digits. How many?

Problem 17. Sam likes to count. His yard has the shape of a rectangle. There is a fence post in each corner of the yard and there are a few more posts supporting the fence. Sam walked around one day and counted the posts. He noticed that there were 17 posts along the front side and 15 posts along the back side of the yard. He also noticed that there were 13 posts along each of the other two sides of the yard. How many posts are there all together?

Problem 18. At some moment between 4 and 5 o'clock John looked at the clock and noticed that the large hand is exactly two minutes ahead of the small hand on the dial. What was the time at that moment?

Problem 19. Starting with the number 12, suppose you perform the following four operations: add 3, subtract 3, multiply by 3, and divide by 3, one after another, each exactly once, but not necessarily in that order. What is the largest number you can end up with?

Problem 20. The electricity went out and it is pitch-dark in your room (you cannot see anything). You are packing for a trip and you know that you have 6 white, 8 black, and 12 maroon socks in your drawer. What is the smallest number of socks you need to pack in your bag to make sure that you have packed at least one matching pair of socks?