5th Grade Competition

Bergen County Academies
21 October 2007

1. A student has to compile 250 questions for a math competition. She asked each student on the math team to write three questions. However, out of 125 students, only 15 students wrote questions. Two students wrote the same three questions. How many questions does the student now have to write to complete the competition?

2. Find $8 + 10 \div 2 + 4 * 2 - 21 \div 7$.

3. $\frac{3}{5} \div \frac{1}{10} = ?$

4. Ashley is 18 years old and Scott is twice her age. If Ashley's mom is 10 years older than Scott, how old is Ashley's mom?

5. Veena began reading Harry Potter and the Deathly Hallows at 12:24AM. If she reads at 253 pages per hour and there are 759 pages, at what time did she finish reading?

6. For every 250 words Lorenzo types, he makes 4 mistakes. If he writes a 5000 word literature paper, how many mistakes can he be expected to make?

7. $\frac{1}{5} + \frac{1}{15} = ?$

8. If one circle's diameter is another circle's radius, then the smaller circle's area is what percentage of the larger circle's area?

9. Suppose that it takes Chirag on average 45 minutes to paint a fence. It takes Trent on average 30 minutes to paint the same fence. If Chirag and Trent worked together to paint the fence, how many minutes would it take them to finish?

10. It takes Carrie 40 minutes to walk between her home and her school. One morning she walked half way to school and remembered that she had left her calculator at home. She ran home. It took 5 minutes to find her calculator when she got home. Then she ran all the way to school. She runs twice as fast as she walks. How many minutes more than usual did it take for her to get to school?

11. Find $|4-7|+|7-4|$

12. Scott bought a record collection for \$10, sold it for \$15, bought it back for \$20, and finally sold it for \$25. How much money did Scott make or lose?

13. The houses on Gauss Street are numbered consecutively from 1 to 602. How many brass digits are needed to form all the house numbers?

14. What is the 10th term in the arithmetic sequence $1, 5, 9, \ldots$?

15. How many degrees are in the measure of the smaller angle that is formed by the hands of a clock when it is 3:00?

16. Find the 6th term in the geometric sequence $3, 6, 12, \cdots$

17. $\frac{3+6+9+12+...+291+294}{4+8+12+16+...+388+392} =?$

18. How many integers equal their own squares?

19. A bag of marbles can be completely divided in equal shares among 2, 3, 4, 5, or 6 friends. What is the least number of marbles that the bag could contain?

20. Find the sum of the counting numbers from 1 to 25, inclusive.

21. Andrew has a new 3-ft-wide bookcase with two shelves, each 15 in. high. He plans to store his CDs on the shelves using new CD racks. Each CD rack is 17 in. wide and 7 in. high, and holds 3 stacks of 12 CDs. How many CDs will he be able to store?

22. If the sum of 5 consecutive even numbers is 320, what is the smallest of the five even numbers?

23. How many factors does the number 3300 have, including 1 and 3300?

24. The mean of a set of 5 numbers is 32. The number 132 is removed from the set. By how much is the mean reduced?

25. The circumference of a circle is 22π. If its radius is halved, then what is the area of the resulting circle (in terms of π)?

26. Robert has two watches, one which loses 6 seconds every 24 hours and one which gains 1 second per hour. He sets both of them to the correct time at 6 : 00 p.m. How many hours will pass before the positive difference between the time shown on both watches is 1 minute?

27. At the HMMT math competition sophomore year, Rachel decided to play a trick on Ethan by putting salt in his soda. She put 40 grams of salt into his 12 oz glass of soda. However, he saw her do this, so when she stepped away, he poured 3 oz of his soda into her glass which had contained only 7 oz. When she came back and took a 1.5 oz gulp, how many grams of salt did she drink?

28. A florist buys roses at \$0.50 apiece and sells them for \$1.00 apiece. If there are no other expenses, how many roses must be sold in order to make a profit of \$300?

29. $\frac{1}{2} * \frac{2}{3} * \frac{3}{4} = ?$

30. $\frac{7^2+7}{7} = ?$

31. A student at the Academies has to be at school by 8:00 a.m. It takes him 15 minutes to get dressed, 20 minutes to eat and 35 minutes to get to school. What time should he get up?

32. At a party, each of 8 friends was given a game card. To play the game, each person had to walk around and trade a card with every other person at the party. How many trades took place?

33. I am a four-digit number with no two digits the same. My ones digit is twice my thousands digit and one less than my tens digit. My hundreds digit is the difference between my tens digit and my thousands digit. My thousands digit is an odd number less than 6. What number am I?

34. $27^{2/3} = ?$

35. Sujin opened her math book and found that the sum of the facing pages was 243. What was the larger page of the two pages where she opened the book?

36. A gasoline tank on a certain tractor holds 16 gallons of gasoline. If the tractor requires 7 gallons to plow 3 acres, how many acres can the tractor plow with a tankful of gasoline?

37. The volume of a cube with edge length of 2 meters is what fraction of the volume of a cube with edge length of 4 meters?

38. Dr. Abramson's AP Calculus class holds a contest to guess the number of candies in the jar. Three people have already guessed, and their guesses are 315, 350, and 327. One of the guesses

is off by 26, one is off by 14, and one is off by 9. How many candies are in the jar?

39. When Ben has a "sharpie battle," he has a 1/3 chance of poking his opponent's arm and a 1/5 chance of poking their neck (neither affects the other). When he faces Yoonjoo, what is the probability that he pokes her arm, her neck, and her arm again in that order?

40. Mr. Teacher is buying 2-liter bottles of soda for his end of the year class party. A 2-liter bottle contains 8 servings. How many bottles must he buy for 20 students, 2 parents, and himself?

41. Ernie has 10 baseball cards. He buys 6 more cards at the store. Ernie then gives Bert 5 cards. How many baseball cards does Ernie now have?

42. Solve for $x : 5 + 47x = 23 - 43x$

43. Ian has a container holding 134 quarts of mixtures of 30% NaCl and 70% H_2O. Ian has a second container holding 50 quarts of mixtures of 50% NaCl and 50% H_2O. If he mixes them, what percent, to the nearest whole percent, the mixture will be NaCl?

44. Find the only four-digit number that is divisible by 25, 27, and 8.

45. What is the surface area of a cube with side length 1.5?

46. The chickens, ducks and pigs in Farmer Lee's barn have the same number of heads and have a total of 72 legs. How many pigs are in the barn?

47. $(((x)^6)^{1/3}) + (((2x)^3)^{1/3}) + (1)^{1/3} = 0$. $x =?$

48. Two passenger trains traveling in opposite directions meet and pass each other. Each train is 1/24 miles long and is traveling at 50 miles per hour. How many seconds after the front parts of the trains meet will their rear parts pass each other?

49. Blocks of molding clay are 9 inches by 6 inches by 3 inches. How many whole blocks are needed to mold a cylindrical sculpture 13 inches high and 6 inches in diameter? Use 3.14 as an approximation of Pi.

50. If $x = 9$, compute the value of $x^6 + 6x^5 + 15x^4 + 20x^3 + 15x^2 + 6x + 1$.