6th Grade Competition

21 October 2007

1. A student is compiling questions for a math competition. There are five levels of competition, each with 50 questions. No question can be repeated. How many questions does she need?

2. What is the probability of choosing a vowel from the alphabet?

3. Mark writes three questions Monday, five questions on Tuesday, seven questions on Wednesday, and so on. How many questions will he have written, in total, at the end of Sunday?

4. An adult working alone requires three hours to do a certain job. A child working alone requires six hours to do the same job. How many hours will it take the adult and child, working together, to do this job?

5. Find the sum of the numbers from 1 to 15 inclusive.

6. 10% of the marbles in Emily's bag are blue. Emily has 50 marbles. How many are blue?

7. Let $A = 1, B = 2, \ldots, Z = 26$. What is $A + T + T + I + T + U + D + E$?

8. My father is 4 times as old as I. In 20 years, he will be twice my age. How old is he now?

9. The peel of a banana weighs about $1/8$ of the total weight of the banana. If you buy 3 kg of bananas at a price of $1.20 per kilogram, how much are you paying for the inside of the bananas?

10. A train is traveling at the rate of 1 mile per 1 minute and 20 seconds. If the train continues at this rate, how many miles will it travel in one hour?

11. Find the 21st term in the sequence $2, 4, 6, 8, \ldots$

12. Snow White bought 1 t-shirt for each of the seven dwarves for $9.95 each. The cashier charged her an additional $13.07 in sales tax. She left the store with $7.28. How much money did she start with?

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

14. How many zoinks can you buy with 300 zonkers knowing the exchange rate is 20 zoinks per zonker?

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

16. If you put aside \$2.00 on January 1, \$4.00 on February 1, \$8.00 on March 1, \$16.00 on April 1, and so on, how much money would you save in six months?

17. In parallelogram $ABCD$, $AB = x + 8$, $BC = 3x$, and $CD = 4x - 4$. What is the perimeter?

18. How many degrees are in the measure of the smaller angle that is formed by the hands of a clock when it is 4 o'clock?

19. An omelet requires 2 eggs and 1 pepper. I have 12 eggs and 8 peppers. How many whole omelets can I make?

20. A parking lot has space for 1000 cars. 2/5 of the spaces are handicapped spaces. There were 200 handicapped cars and some non-handicapped cars in the parking lot. The parking lot was 3/4 full. How many non-handicapped cars were in the parking lot?

21. Two weeks ago, stores A and B sold shirts at \$10. Last week, store A raised prices by 15% while store B reduced prices by 15%. Realizing their mistakes, yesterday store B raised prices by 15% while store A reduced prices by 15%. What is the difference in prices today?

22. Riding their bicycles, Alex and Brian leave from two different places at the same time and ride directly toward each other. Alex rides at 10 mi/h and Brian rides at 8 mi/h. If they meet after 40 minutes of riding, how far apart were they at the beginning?

23. The average of seven numbers is 49. If 1 is added to the first number, 2 is added to the second number, 3 is added to the third number and so on, what is the new average?

24. The length of a rectangle is four times as long as its width. The area of the rectangle is 100 metres squared. What is the length of the rectangle?

25. Homer Simpson entered a pie eating contest. Determined to win, he trained for 6 days. Each day he ate 4 more pies than the day before. Homer ate 150 pies while in training. How many pies did he eat on the 6th day?

26. A *palindrome* number, such as 22 or 565, is the same when written forwards or backwards. How many palindromes are there that are less than 1000?

27. The number of hours that were left in the day was one-third of the number of hours already passed. What time is it?

28. My change purse contains 16 coins in dimes and quarters. If the value is $2.50, how many dimes are there?

29. Sophia receives a 15% discount on an item. She has a 10% coupon as well. What is the total percent discount?

30. Bob, Don, Alice, Carol, and Eve want to sit at a circular table so that the boys do not sit next to or across from each other. If Alice must sit next to two girls, how many possible arrangements are there?

31. The vertices of a triangle are at (3,1), (8,1) and (8,3). What is the area of the triangle?

32. Mr. Teacher asked the children to find the consective pages in their math books whose page numbers add up to 85. What is the larger of the two pages?

33. A decade ago, I bought a car for $40,000. I have since paid $5,000 a year for maintenance and $0.10 per mile for gas. I have driven 10,000 miles per year. How much have I spent on my car since I purchased it?

34. A manufacturer claims that a new motor oil saves 5% of the gasoline used by a car. You and a friend have identical cars and drive the same $21,000$ kilometres per year. You use the new motor oil but your friend does not. If your friend gets 42 kilometers per gallon, how many gallons of gasoline do you save in one year?

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

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

37. The measure of the supplement of an angle is 4 times the measure of its complement. Find the measure of the angle, in degrees.

38. How many terminating zeroes does the number $(215)(34)(59)(710)$ have?

39. Mr. Teacher awards extra credit points to his students with test grades out of 100 that are below the average of the 6th grade class. If 73 students take the same test, what is the largest number of students who can be awarded extra credit?

40. Watson assigns consecutive letters of the alphabet increasing consective integer values, starting from A. If $H + K + L + P = 2007$, then what is Z?

41. In Flatland, there are four types of coins. A zonk is worth 10 bonks. A conk is worth 8 bonks. A donk is worth 10 zonks. I have 227 bonks. What is the smallest number of coins I could have?

42. Three numbers are chosen from the set $\{1, 2, 3, 4, 5, 6\}$ and added. What are all of the possible sums?

43. How many factors does the number 540 have?

44. Farmer John has 20 yards of fence. He wants to create a rectangular pen for his cows. What is the largest area, in square yards, that he can enclose?

45. Find the only four-digit number that starts with the digit 7 and is divisible by 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.

46. A drawer contains 3 red socks, 5 blue socks, and 7 yellow socks. Without looking, what is the smallest number of socks that must be chosen so that you can be sure that you have at least three socks of each color?

47. A convex polygon has n sides and $9n$ diagonals. Find the value of n.

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

49. What is the units digit of $1^{1000} + 2^{1000} + 3^{1000} + 4^{1000} + 5^{1000} + 6^{1000}$?

50. During a grim medieval battle, 85% of the warriors lost an ear, 80% lost an eye, 75% lost an arm, and 70% lost a leg. What is the smallest percentage possible of combatants who lost all of the above?