Bergen County Academies Math Competition (Grade 6)
October 26th, 2003

1. Calculate $1 + 2 \times 3$.

2. In the word DIOPHANTINE, what fraction of the letters are vowels?

3. If a bicycle costs \$35.55 and Tom has \$29.55, how many more dollars does he have to save in order to buy the bike?

4. A problem author for a math competition wrote 44 problems so far, but he needs a total of 50. How many more problems must he write?

5. My grandfather clock chimes on the hour, every hour. How many times will it chime between 3:30PM today and 3:30PM two days from now?

6. Compute $1.123 + 1.01 + 0.1111$.

7. What is the sum of the first six positive odd numbers?

8. Compute $\frac{1}{2} - \frac{1}{3}$.

9. A rectangle has length 19 and width 14. What is its perimeter?

10. Express $\frac{13}{4}$ in decimal form.

11. My favorite number is 1337. There is one special number that I can multiply by 7 to obtain 1337. What is this number?

12. My doctor told me that I am 5 feet and 10 inches tall. If there are 12 inches in a foot, how tall am I in inches?

13. Evaluate $17 - 16 + 15 - 14 + \cdots + 3 - 2 + 1$.

14. Mr. Holbrook bought \$5 worth of cheese balls, \$6 worth of donuts, \$2 worth of soda, and \$4 worth of candy. Since he is a regular customer at the store, he gets 50% off his purchase. If he pays with a \$20 bill, how much change will he receive?

15. A slice of pizza costs \$1. A pie, which is composed of 8 slices, costs \$6. Ann buys 5 pies. How much money did she save by doing this instead of buying all the slices individually?

16. A member of a track team can run a mile in five minutes. If she can maintain this speed for as long as she wants, how many hours would it take her to run 36 miles?

17. Compute 1.55×21.4.

18. In a baseball game, Chu hits three singles (1 base), one double (2 bases), one triple (3 bases), and one home run (4 bases). For this game, how many bases did Chu average per hit?

19. Eve likes solving math problems as a hobby. It takes her 73 days to solve 6 of them. How many problems can she solve in three years if none of them are leap years?

20. There are three whole numbers in a row, and their sum is 18. What is their product?

21. What is 200% of 50% of 20% of 50?

22. How many positive multiples of 13 are less than 100?

23. Jason is taking a math competition in which he must solve 50 problems in 1.5 hours. He made the mistake of staying up last night playing computer games, and falls asleep for the first thirty minutes of the competition. If he wishes to receive a perfect score, how many seconds, on average, should he spend per problem after his nap?

24. The Academy Math Team wants to purchase some tee shirts. The first tee shirt costs \$182, and each subsequent shirt costs \$2. If there are 90 people on the team, and the team equally distributes the cost amongst its members, how much does each member have to pay?

25. A *prime number* is a positive whole number whose only positive divisors are 1 and itself. For instance, 2, 3, 5, and 7 are examples of *prime numbers*. What is the smallest *prime number* greater than 90?

26. A gigantic rabbit weighs a thousand pounds. A *ripped man* can lift up to 160 pounds. How many *ripped men* are needed to lift this rabbit?

27. Ralph Wiggum likes picking his nose. However, every time he does, the number of bacteria on his finger doubles. There are 3 bacteria on his finger right now. How many bacteria will be on his finger if he picks his nose seven times?

28. Harry is addicted to cheese balls. A tub of 48,000 cheese balls costs 5 dollars. He continuously eats cheese balls at a rate of 100 cheese balls per minute. However, he drops exactly one cheese ball per second, which he does not eat or notice. Wanting to enter the *Guinness Book of World Records*, Harry buys exactly enough cheese balls to last him five hours. How many dollars did he spend?

29. I number the pages of a book from 1 to 55. How many times do I use the digit 2?

30. Calculate $125 \times 125 \times 8 \times 8 \times 8$.

31. What two-digit number evenly divides both 323 and 391?

32. On a warm day, the temperature was 77 °F. The conversion between Centigrade and Fahrenheit is: $°\text{C} = \frac{5}{9} \times (°\text{F} - 32)$. What was the temperature in degrees Centigrade?

33. A painter mixes 4 gallons of white paint with 1 gallon of red paint to make 5 gallons of her signature pink paint. Each gallon of white paint costs \$2 and each gallon of red paint costs \$3. How much money does the painter need to make 400 gallons of pink paint?

34. My computer is capable of only one process: When I enter a two-digit number, it reverses its digits, subtracts 7 from the result, and gives this final number as its answer. For example, if I enter 34, the computer first reverses its digits to obtain 43, and then subtracts 7 to give its final answer 36. When I put in another number, the computer gave me 22 as its final answer. What number did I enter?

35. The Road Runner ran 200 miles in 10 minutes, walked 40 miles in 20 minutes, and then ran another 360 miles in 10 minutes. What was its average speed for the whole trip in miles per hour?

36. There are 120 pieces of candy in a bowl. Adam takes a third of them. Then, Ben takes a fourth of what remains. Finally, Cory takes a fifth of what remains after Adam and Ben took their shares. After Cory leaves, David eats the rest of the candy in the bowl. How many pieces of candy did David eat?

37. The *blip*, a unit for measuring silliness, is equal to five *bloops*. A *hectablip* is equal to 100 *blips*, and a *kilobloop* is equal to 1000 *bloops*. How many *kilobloops* are equal to 200 *hectablips*?

38. What is the least positive number divisible by 4, 5, 6, and 9?

39. Find the number halfway between $\frac{1}{21}$ and $\frac{1}{23}$.

40. John chooses the numbers 10, 24, 18, and 8, and Joanne chooses 20, 9, 12, and 16. What does John obtain if he multiplies his numbers and divides the result by the product of Joanne's numbers?

41. We have 5 numbers whose average is 11. Suppose we include 29 as a sixth number. What is the new average of these 6 numbers?

42. Define $n!$ as the product of the first n counting numbers. For instance, $4! = 1 \times 2 \times 3 \times 4 = 24$. Compute $11! \div 8!$.

43. Mark likes playing with averages. He chooses four numbers a, b, c, and d. He then calculates the average of a and b and calls it e. He also calculates the average of c and d and calls it f. He finds that the average of e and f is 14. What is $a + b + c + d$?

44. A number is said to *deny* another number if the remainder after dividing the first number by the second number is exactly 4. For instance, 39 *denies* 7, because when 39 is divided by 7, the quotient is 5 and the remainder is 4. How many whole numbers between 200 and 300 *deny* 6?

45. In the game of *Mafball*, points can only be scored in 3 points or 5 points. What is the largest unattainable score in *Mafball*?

46. Andy can paint a fence in 1 hour by himself, and Bobby can paint a fence in 2 hours by himself. How many minutes does it take Andy and Bobby to paint a fence together?

47. If A, B, C are three distinct points such that all three do not lie on one line, how many parallelograms can be formed using A, B, C, and a fourth point?

48. A fruit company orders 4800 pounds of oranges at \$1.80 per pound. The shipping cost is \$3000. Suppose 10% of the oranges are spoiled during the shipping and the remaining oranges are all sold. What should the selling price per pound be, given that the fruit company wants to make a net 8% profit?

49. Let $\lceil x \rceil$ denote the least whole number greater than or equal to x. For example, $\lceil 3.6 \rceil = 4$, $\lceil \frac{16}{7} \rceil = 3$, and $\lceil 5 \rceil = 5$. Calculate $\lceil \frac{1}{3} \rceil + \lceil \frac{2}{3} \rceil + \lceil \frac{3}{3} \rceil + \cdots + \lceil \frac{97}{3} \rceil + \lceil \frac{98}{3} \rceil + \lceil \frac{99}{3} \rceil$.

50. A *palindrome* is a number such that it is read the same regardless of whether the digits are read forwards or backwards. For example, 141, 7007, and 8888 are *palindromes*, whereas 345 and 5959 are not. How many even, four-digit numbers are *palindromes*?