4th Grade Competition

Bergen County Academies Math Competition
19 October 2008

1. Before taking the AMC, a student notices that he has two bags of Doritos and one bag of Skittles on his desk. Each bag of Doritos is 130 calories, and each bag of Skittles is 60 calories. If the student eats both bags of Doritos and eats the Skittles, then how many calories will he have eaten?

2. A section of seats at Beaver Stadium has 80 rows. If each row has 50 seats, then how many seats are in the entire section of seats?

3. Find $35 \div 5$.

4. David Rush is in a hurry to get to class. His dorm at Philips Exeter is 600 meters away from his first class. If he runs to class at a speed of three meters per second, how many seconds does it take him to get to class?

5. $\triangle ABC$ has sides of lengths 4, 5, and 6. Find the perimeter of $\triangle ABC$.

6. Find $37 \times 108 + 37 \times 92$.

7. $4 + 44 + 444 + 4444 + 44444 = ?$

8. Suppose that $a@b = 17a^2 - 13b^3$. Find 3@2.

9. Compute $3 + 4 \times (20 - 10) \div 2$.

10. Brian Basham bashes rocks for exercise. On the first day, he bashed one rock. The next day he bashed three rocks, on the third day he bashed five rocks, and so on. How many rocks did he bash after five days of exercise?

11. A dog runs in a circular path of radius 16 feet. If the dog completes exactly one run around the circle, then how many feet will the dog have travelled? Round your answer to the nearest foot.

12. Bob is thinking of a number that leaves a remainder of 5 when divided by 12. What remainder does Bob's number leave when divided by 4?

13. A trapezoid has three angles that measure 82, 47, and 98 degrees. What is the degree measure of the fourth angle?

14. How many numbers less than 1000 are both perfect cubes *and* perfect squares?

15. Find the perimeter of a right triangle with legs of lengths 6 and 8.

16. A football team has 105 members. If 45 of these players play at least one play in a certain game, then what fraction of the team played at least one play that game?

17. What is the length of a side of a square with area 121?

18. Josh and Kun-Soo have 2008 Frosted Flakes each. Josh gives Kun-Soo 550 flakes, but Kun-Soo gives 692 flakes back to Josh. How many flakes does Josh have now?

19. At math team, three bags of chips is equal to a can of soda and 7 boxes of Nerds are equal to three bags of chips.

How many cans of soda are 35 boxes of Nerds equal to?

20. Emily, John, Ben, and Craig are playing a game of hearts. They are each dealt 13 cards from a standard 52 card deck. What is the probability that Emily gets the queen of spades?

21. How many prime numbers are less than 20?

22. Find the perimeter of a rectangle that has area 20 and one side of length 2.

23. A 30-60-90 right triangle has a hypotenuse of length 12. Find the length of the shorter leg.

24. A is a digit (a number from 0-9). Find the sum of all A that make the number $612663A$ even.

25. What is the 59th term of the sequence $A, B, C, D, A, B, C, D, A, B, C, D, A, B, C, D, ...$?

26. Compute the volume of a cube with side length 13.

27. $1 + 0 + 1 + 1 + 1 + 2 + 1 + 3 + 1 + 4 + 1 + 5 + 1 + 6 + 1 + 7 + 1 + 8 + 1 + 9 =$?

28. How many $2 \times 2 \times 2$ blocks does it take to completely fill a $10 \times 12 \times 14$ box?

29. What is the area of a circle with radius 3, rounded to the nearest tenth? Answers in terms of π are not accepted.

30. Find the area of an isosceles triangle with sides of length 4, 8, and 8.

31. Hannah is cramming for the SAT, and needs to memorize 150 words. She can cram 50 words each morning, but will forget 40 of them after that night. After how many mornings of studying will Hannah be able to write the correct definition of all 150 words?

32. The *semiperimeter* of a triangle is one-half of the perimeter. The inradius (r), area (K), and semiperimeter (s) of a triangle are related by the equation $K = rs$. Find the inradius of a right triangle with sides of lengths 7, 24, and 25.

33. If Russell has a colony of ants that double in population every half hour, how many ants will he have at the end of four hours if he starts with 2 ants?

34. Compute $1^2 + 2^2 + 3^2 + 4^2 + 5^2$.

35. The formula for converting Fahrenheit temperatures to Celsius temperatures is $C = \frac{5}{9}(F - 32)$. Convert 77^oF to degrees Celsius.

36. Austin runs an animal hospital that takes care of cats and birds. The cats here have four legs and no tails while the birds have two legs and two tails each. Victoria, the hospital inspector, walks in one day and counts fifteen heads, 46 legs, and 14 tails. How many cats were there?

37. Nikhil is writing the page numbers for a book that has 37 pages. The first page is page 1. How many digits does Nikhil have to write to accomplish this task?

38. What is the sum of the interior angles of a hexagon, a figure with 6 sides?

39. Tanya wants to arrange her dresses in a line. She has five dresses: 2 red, 1 green, 1 yellow, and 1 blue. She does not want the two red dresses to be next to each other. In how many ways can she line up her dresses?

40. It is pitch black, and James is picking socks out of a drawer containing 10 red socks, 10 blue socks, 10 yellow socks, and 10 white socks. James cannot see the color of the socks that he is picking out of the drawer. How many socks must James take out of the drawer to be sure that he has taken out 4 pairs of socks? A pair of socks is two socks that are the same color. Each sock can only be counted in one pair.

41. If $n! = n(n-1)(n-2)\ldots 3\cdot 2\cdot 1$, then find $\dfrac{6!}{4!}$.

42. In how many ways can 10 be written as a sum of three (not necessarily distinct) positive whole numbers? The order of the numbers does not matter.

43. If I flip a coin that has one side heads and one side tails three times, what is the probability that I get heads, tails, heads, in that order?

44. Find the sum of the first 30 terms of the arithmetic sequence 3, 7, 11, …

45. Convert 111_6 – a number written in base 6 – to base 10.

46. Compute the volume of a cube that has a surface area of 216.

47. How many numbers between 1 and 101 are multiples of 3 or 4?

48. A palindrome is a number that is read the same way forwards as it is backwards. For example, the numbers 14541 and 1221 are palindromes, but the number 132531 is not. How many three-digit numbers are palindromes? (A three-digit number cannot start with the digit 0.)

49. Find a number x besides 0 that satisfies $|x - |3x|| < 1$.

50. A positive whole number is called relatively prime to another positive whole number if it shares no factors other than 1 with the second number. How many numbers less than 38 are relatively prime to 38?