# Bergen County Academies Math Competition - 4th Grade

## General Rules

- Calculators are not allowed.
- This is an individual test, so you may not communicate with anyone else taking it.
- Once time begins, we will not answer any questions about the problems.
- You will have 90 minutes to solve 50 problems. Once time is called, you must put down your pen or pencil and stop working.
- Scores will be posted on the website within a couple of days. Your score will appear next to your identification number.

## Specifics

- You may use space on your test paper and additional scrap paper to do work. Your answers must be written on the answer sheet. We will not look at answers written on your test paper.
- Each problem has only one answer. If you put more than one answer for a problem, you will be marked wrong. When changing an answer, be sure to erase or cross out completely.
- Write legibly. If the graders cannot read your answer, it will be marked incorrect.
- Fractions should be written in lowest terms. For example, if the answer is $\frac{1}{2}$, then $\frac{2}{4}$ will not be accepted although the two fractions are numerically equal.
- All other answers should be written in simplest form.
- If a unit is indicated in the problem, the answer must be given in that unit. For instance, if the problem asks for the answer in hours, you cannot give your answer in minutes. Furthermore, you don't need to write the unit, as the graders will assume your answer is in the units asked for in the problem.
- There is no penalty for guessing.
- Ties will be broken based on the number of correct responses to the last ten questions. If a tie remains, then the correct responses to the last five questions will break the tie.
- We will announce how much time is remaining often during the test.

1. What is the nonnegative difference of the ones place of 2100 and the ones place of 3100?
2. If a ninja steals \$73 worth of gold every minute, how much gold does he steal in 5 minutes? Answer in dollars.
3. A section of seats at Vankee Stadium has 30 rows. If each row has 67 seats, then how many seats are in the entire section of seats?
4. Andrew and Tom have 2010 Frosted Frakes each. Andrew gives Tom 260 frakes, but Tom gives 640 frakes back to Andrew. How many frakes does Andrew have now?
5. Compute $6 \times 0 \times 4 \times 0$.
6. Evaluate the following: $26262 + 36363 + 138439$.
7. Austin has 252 gems, 64 of which are sapphires. How many gems does he have that are not sapphires?
8. Henry has 6 apples and 4 bananas. Each apple costs a dollar and each banana costs 50 cents. How many cents did he spend to buy all of them?
9. A Gigantic Lion weighs 1000 pounds. A Gigantic Man can lift up to 260 pounds. How many Gigantic Men are needed to lift this Gigantic Lion?
10. A Chess team has 64 members. If 16 of these players play at least one game in a certain tournament, then what fraction of the team played at least one game in that tournament?
11. Mike wrote 12 problems for a math competition so far, but he needs a total of 64. How many more problems must he write?
12. Compute $\frac{1}{6} + \frac{1}{9}$.
13. I am 5 feet and 4 inches tall. If there are 12 inches in a foot, how tall am I in inches?
14. Triangle $ABC$ has sides of lengths 4, 5, and 6. Find the perimeter of $ABC$.
15. Find $1111 \times 1111$.
16. Find the number halfway between $\frac{1}{8}$ and $\frac{1}{10}$.
17. Express $\frac{1}{16}$ in decimal form.
18. I have one ten dollar bill and two quarters. A water bottle costs \$1.75. What is the maximum number of water bottles I can buy?
19. Regina and Ben live 60 meters away from each other on the same street. They want to plant 5 trees between their houses, evenly spaced out. How far should the distance be from one tree to another?
20. Isabel and Jie are playing a game. Isabel asks Jie to pick a number. She then asks him to add 26 to that number, multiply his answer by 2, subtract 36 from his new answer, divide that answer by 5, and multiply this answer by 2. If Jie picks the number 2 in the beginning, what number does he have at the end?
21. If History is on channel 64 and Disney is on channel 26, how many times does Jeff have to hit the "channel down" button in order to switch from History to Disney?
22. How many \$0.25 packs of gum can I purchase with \$3.33?
23. Calculate 2.71+7.18+1.828.
24. If 26 people were on a bus initially, and at the first stop 9 people boarded the bus and 18 people left the bus, how many people are on the bus after the first stop?
25. Compute the number of letters in the alphabet plus the number of days in a week plus number of days in the month of December.

26. The product of two distinct positive whole numbers is 17. What is their sum?

27. In the word $MATEMATIKA$, what fraction of the letters are vowels?

28. A retail store bought 3000 bracelets at a price of six for \$2. They sold all the bracelets at a price of two for \$1. What was its profit, in dollars?

29. Jonathan and Kyle are both standing on a 3-by-3 square in the $XY$-plane. Jonathan is at bottom left square and Kyle is at the top right square. Jonathan can only move right or up one square at a time. Jonathan needs to move up and right twice in order to get to Kyle. How many ways are there for him to get to Kyle?

30. A groundhog pops out of his hole every hour. Another pops out every 40 minutes. If at 9:00AM they both pop out, what is the next time they will pop out together?

31. What is the greatest common factor of 455 and 70?

32. How many prime numbers are between 1 and 10, inclusive?

33. Jongwhan needs some ideas to create problems for the BCA Math Competition, so he decides to walk around his house while he brainstorms. The perimeter of his house is 240 feet, and he walks at a constant speed of 4 feet per second. If Jongwhan creates 10 problems every time he completes a lap, how many minutes will it take for him to create 250 problems?

34. Mary is bored and writes down the numbers $-4, -1, 2, 5, \ldots, 32$, where every number she writes down is 3 more than the previous one she wrote down. How many numbers did she write down?

35. Terence Tao writes down one 1, two 2's, three 3's, etc. on a sheet of paper (so the number he writes down will look like 122333...) Find the thirtieth (30th) number that he'll write down.

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

37. What is the remainder when 123456789 is divided by 6?

38. What is the length of a side of a square with area 144?

39. Compute the volume of a cube with side length 8.

40. Find the sum of the odd multiples of 5 that are greater than 10 and less than 50.

41. Find the perimeter of a rectangle that has area 24 and one side of length 4.

42. Sungjae's math level was zero at the beginning of last year. Every time he does a nontrivial problem, his math level increases by two, and every time he does a trivial problem, his math level decreases by one. Last year, Sungjae did 58 nontrivial problems and 87 trivial problems. What is his current math level?

43. Michelle decides to eat one piece of milk chocolate and one piece of white chocolate every day for three weeks. A piece of milk chocolate costs \$2 more than a piece of white chocolate, and the cost of Michelle's chocolate over the three weeks is \$105. How many dollars does one piece of milk chocolate cost?

44. Dr. Abramson is preparing to give his students their math final test scores. Stephanie decides to question him about every aspect of the class's scores. Dr. Abramson becomes angry and threatens to punish her by taking off $\frac{2}{7}$ of a point for every question she asks. If Stephanie's original score was a 100, what is the maximum number of questions she can ask and still pass? (65 and below is failing)

45. What is 2(2-2(2-2(2-2(2-2(2)))))?

46. Austin is the winner of the local chess tournament. If the tournament is single-elimination with no byes (matches that a player can choose not to play in), and Austin defeated seven opponents to win, how many competitors were left in the tournament after Round 1?

47. Chan, who is 6 feet tall, stands next to a tree. The length of his shadow is 3 feet, and he measured the length of the trees shadow to be 10 feet. Find the height of the tree.

48. Alex wants to buy a book from Austin. His encounter with Austin will be awkward if either Alex forgets the money or Austin forgets the book, but will not be awkward if both of them remember or both of them forget. Given that the chance that Alex forgets his money is 60% and the chance that Austin forgets his book is 10%, find the probability that their encounter will not be awkward.

49. At AwesomeMath, Michael, instituted a rule where if either of his roommates, Jongwhan or James, forgot to turn off their lights, they had to do $3x - 2$ pushups, where $x$ was the $x$th time either of them neglected to turn off their lights (so if Jongwhan forgot to turn it off, then James forgot, Jongwhan would do 1 pushup and James would do 4). If James didn't turn his lights off the 2nd, 4th, 5th, and 6th times and Jongwhan didn't turn his lights off the 1st, 3rd, and 7th times, how many more pushups did James do than Jongwhan?

50. What is the area of an equilateral triangle with side length 2?