The 34th Annual Connecticut Community Colleges Math Contest

Directions for Student Participants

Please read these directions carefully before starting the test!

1. Only students currently enrolled in the community college system are eligible to participate.
2. Do not begin the test until instructed by the test monitor.
3. You have two hours to complete all the questions. Some questions are worth 1 point, some are 2 points, some are 3 points, and some are 4 points.
4. You are allowed to use calculators. No books, notes, or other aids are allowed. You may not share calculators during the test.
5. You will be provided with scrap paper and graph paper, on which you can do all your work.
6. All answers MUST be recorded on the answer sheet provided. Answers must be fully simplified, and exact answers must be given unless otherwise specified.
7. All answers must be complete, legible, and with the proper units or labels (for example: inches, pounds, dollars, miles per hour, etc.) No partial credit is given.
8. Please record all answers with a ball point pen.
9. Please sign the answer sheet and initial the test question sheet with a ball point pen.
10. Please return all test papers to the test monitor before leaving, which you can do once you are done.

Sincerely, the Contest Committee

The 34th Annual Miguel Garcia Math Contest

Sponsored by MATYCONN: Spring 2025

One Point Questions:

1. If $x + y = 8$, $y = z - 3$, and $z = 1$, what is the value of x?

2. What is the smallest integer such that the sum of the digits is 11?

3. How many multiples of 9 are there between the numbers 3004 and 4003?

4. On the school bus, there are three boys; Andrew, Brady, and Cooper discussing their favorite superheroes; Spiderman, Batman, and Thor. The boys are all different ages; 6, 8, and 10.

    a. Cooper likes Spiderman
    b. Andrew isn't 8.
    c. Brady doesn't like Thor.
    d. Cooper is 10.

    How old is the boy who likes Batman?

5. Sue and Aja bet $1 each time they play a round of golf. Sue has won three rounds, and Aja is ahead by $5. How many rounds of golf have they played?

6. What is the smallest prime number with two sevens in it?

Two Point Questions:

7. A group of people were at the dog park with their dogs. The number of legs was 28 more than twice the number of heads. (Assume no one is missing a leg or head). How many dogs are there at the park?

8. Solve:

$$\left(\frac{x^2}{3}\right) \div \left(\frac{x}{6}\right) = 3$$

9. Steve, Nick, Kathy, Lisa, and Andre are eating apples. Steve finished before Nick, but after Kathy. Lisa finished before Andre, but after Nick. Who finished their apple last?

10. Find the missing value x for the pattern:

$$6°4 = 100$$
$$7°5 = 144$$
$$9°x = 169$$

11. Solve: $(m-6)(m+6) = 13$

12. If $ab = 10$ and $a + b = 7$ and $a > b$, what is the value of $b - a$?

13. Find the smallest positive integer n such that $n! + 1$ is a perfect square.

14. The Phillies played the Mets during spring training. When the number of runs the Mets scored is added to 36, the sum is 5 times the number of runs the Phillies scored. When the number of runs the Phillies scored is subtracted from 36, the difference is 7 times the number of runs the Mets scored. How many runs did the Phillies score?

Three Point Questions:

15. Simplify:

$$\frac{72! \times 70}{72 \times 70!}$$

16. A family consists of mom, dad, big sister, and little sister. Dad is five years older than mom. Big sister is twice as old as littler sister and one-third as old as mom. In five years, little sister will be the same age as big sister is now. How old is dad?

17. Some students in the student lounge were asked about their enrollment in science, engineering and humanities classes. The results were as follows:
    a. 24 are taking a science class, 22 are taking an engineering class, and 17 are taking a humanities class
    b. 5 are taking both science and engineering classes (some may also be taking humanities)
    c. 4 are taking both science and humanities classes (some may also be taking engineering)
    d. 3 are taking both engineering and humanities classes. (some may also be taking science)
    e. 2 are taking classes in all three areas.

    How many students are taking a class in just one area?

18. There exists a two-digit number such that the product of the two digits plus the sum of the two digits is equal to the number. What is the value of the digit in the one's place?

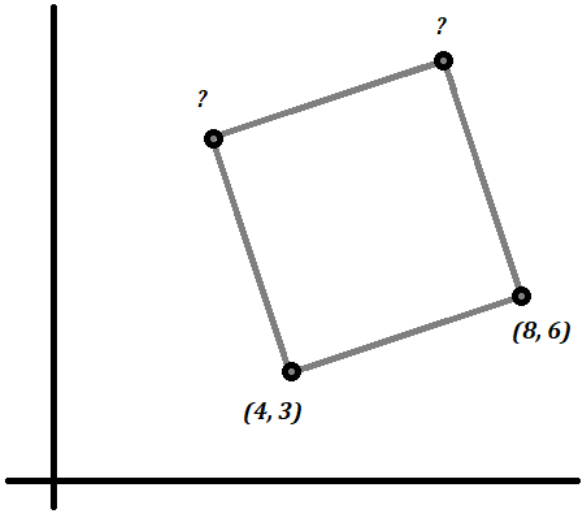
19. Find all positive integers n that satisfy $n^4 + 6n < 6n^3 + n^2$

20. Solve $x^{x+3} = 32$

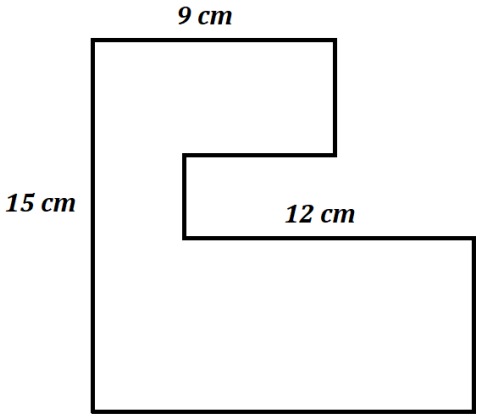
Four Point Questions:

21. Given $81^x + 81^x + 81^x = 3^{25}$, what is the value of $\sqrt[3]{x + 337}$

22. If the line segment connecting ordered pairs (4, 3) and (8, 6) form one side of a square, find the other two order pairs of the square:



23. Find the perimeter of the entire shape below given these three sides. *(not to scale)*



24. Suppose a and b are two *different* real numbers for the function
$f(x) = x^2 + ax + b$
If $f(a) = f(b)$ what does $f(2) =$?

25. If $f(1) = 191$ and $f(1) + f(2) + \cdots + f(n) = n^2 f(n)$, for all positive integers n, Then what does the value of $f(9) =$