EMCC 2026

Speed Test

January 18, 2026

Do not open the booklet until you are instructed to do so.

This is the Speed Round of the EMCC. There are 20 problems, worth 1 point each, to be solved in 25 minutes. There is no penalty for guessing. As with all other rounds, calculators, graph paper, lined paper, rulers, protractors and compasses are prohibited.

The answer to a problem may not necessarily be an integer. See the provided *Acceptable Forms of Answers* sheet for a breakdown of correct and incorrect ways to express an answer.

The opposite side of this page contains the answer form. Once you are instructed to begin the test, tear this page off of the booklet. At the conclusion of the Speed Round, only this page will be collected. Anything written elsewhere on the booklet will not be read or scored.

Best of luck!

Name: _____   **Team:** _____

ID #: ____ ____ ____ - ____ ____

Speed Test Answer Form

Tear this page off the rest of the booklet; this is the only sheet of paper that will be collected. Make sure that all identifying information has been filled in on the other side of this page.

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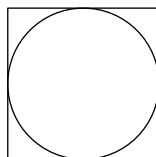
14. _____

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19. _____

20. _____

Speed Test

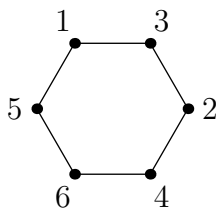*There are 20 problems, worth 1 point each, to be solved in 25 minutes. Answers must be simplified and exact unless otherwise specified. There is no penalty for guessing.*

1. What is the average of 9999 and 100001?

2. What is $\sqrt{36 \times 49}$?

3. A circle is inscribed in a square, as shown below. If the area of the square and the circumference of the circle are both equal to x, what is x?
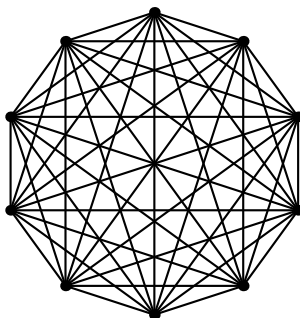

4. Grant studies for 6 hours and 26 minutes, beginning a minutes after midnight and finishing b minutes after 7:00 AM. What is $a - b$?

5. If
$$x + (x + 1) + (x + 2) + (x + 3) + (x + 4) = 100 + 102 + 104 + 106 + 108,$$
what is x?

6. What is the largest integer dividing 432, 324 and 243?

7. The numbers 1 through 6 are written at the vertices of a hexagon below. In a move, Alice can swap any two numbers. What is the fewest number of swaps necessary for the numbers to be sorted in either clockwise or counterclockwise order?

8. What fraction of the numbers in $\{1, 2, 3, \ldots, 899\}$ are perfect squares?

9. Alice and Bob are attendees at a party with 10 people total. Each person randomly chooses somebody else at the party to gift a present. What is the probability that somebody gets a present from both Alice and Bob?

10. An equilateral triangle with area 10 has side length s. What is the area of a regular hexagon with circumradius s?

11. Jesse is purchasing gas masks. He doesn't know the price of one gas mask, but he knows it costs \$274.32 to buy 9 gas masks. What is the fewest number of gas masks that Jesse must buy so that the total is an integer number of dollars?

12. Let ℓ be a line with slope 2 and let m be a line with slope -1. Lines ℓ, m and x-axis determine a triangle with an area of 108. How far apart are the x-intercepts of ℓ and m?

13. When an unfair coin is flipped 10 times, there is a $\frac{2}{3}$ chance that the total number of heads is even. If, instead, the coin was flipped 20 times, what is the probability that the total number of heads is even?

14. What is the sum of the digits in the decimal expansion of 5^{-8}?

15. In isosceles triangle ABC with $AB = AC$, the incircle passes through the centroid. What is AB/BC?
   (The *centroid* of a triangle is the common intersection point of its three medians.)

16. Lotad draws the sides and diagonals of a regular 10-sided polygon. Then, she draws a line ℓ that does not pass through any vertices in the polygon. What is the maximum possible number of sides and diagonals that ℓ could intersect?

17. A *repdigit* is a positive integer whose digits are all the same. What is the maximum number of distinct digits that the absolute difference of two repdigits could have?

18. A 7-digit integer has strictly increasing digits from left to right. How many such integers are divisible by 3?

19. In a 3 by 12 grid of unit squares, Albert wishes to draw diagonals in some of the unit squares such that the diagonals form a single cycle that does not cross or touch itself. How many ways can Albert draw these diagonals?

20. Let $PA_1A_2\cdots A_{10}$ be a pyramid such that base $A_1A_2\cdots A_{10}$ is a regular 10-sided polygon. There exists a sphere tangent to every face of the pyramid, as well as a sphere passing through every vertex of the pyramid. Given that these two spheres share a center, what is $\angle PA_1A_2$, in degrees?