

2026 Division A Individual Round

Written by the VAMO Team



INSTRUCTIONS

1. **Do not open this packet until the proctor directs you to.**
2. For the Division A Individual Round, you will have 30 minutes to answer 15 free response questions.
3. Be sure to mark all answers on the Answer Sheet along with your name. This is the page that will be collected and scored.
4. You will receive 1 point for each correct answer and 0 points for each incorrect answer, for a maximum of 15 points.
5. No problems will require the use of a calculator. Permitted aids include and are limited to scratch paper, graph paper, rulers, compasses, protractors, and erasers. No calculators, smartwatches, or computing devices are allowed.
6. Figures are not necessarily drawn to scale.



Van Antwerp Math Olympiad 2026
Individual Round Answer Sheet

Full name: _____

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

6. _____ 7. _____ 8. _____ 9. _____ 10. _____

11. _____ 12. _____ 13. _____ 14. _____ 15. _____

VAMO 2026 Division A Problems

Problem 1

A passcode for a certain lock is a 3-digit sequence of the integers 1, 2, and 3, such as 132. How many passcodes contain the digit 2 at least once?

Problem 2

For the function $f(x)$, $f(2) = -6$ and $f(4) = 14$. If $f(x)$ can be written in the form $x^2 + ax + b$, find $a + b$.

Problem 3

How many positive integers divide both 240 and 336?

Problem 4

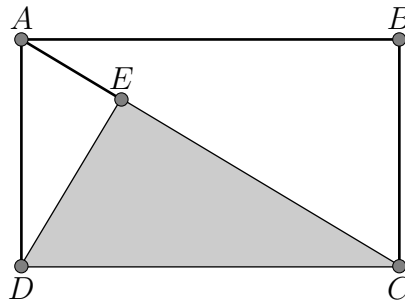
What is the largest integer n such that 3^n divides $(6!)^4$? Recall that $6! = 6 \times 5 \times \cdots \times 1$.

Problem 5

Two diagonals of a regular hexagon are chosen at random. What is the probability that they intersect at a point in the interior of the hexagon?

Problem 6

Rice farmer Brian has a rectangular field $ABCD$ of lengths 3 and 4. The land above the diagonal $\overline{AC}$ is unusable. Additionally, Brian marks off part of the field for animal use. To do this, he walks from D to $\overline{AC}$ so that his path is perpendicular to $\overline{AC}$ and ends at E . What is the area of $\triangle CDE$?

**Problem 7**

Find the smallest positive integer k for which the functions $f(x) = x^2 + k$ and $g(x) = kx$ intersect.

Problem 8

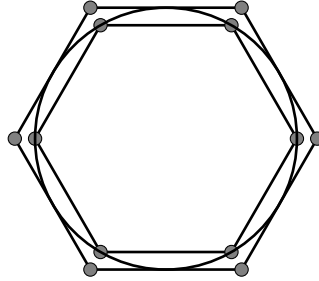
What are the last two digits of 7^{2026} ?

Problem 9

How many ordered triples of positive integers (a, b, c) satisfy $a + b + c = 26$?

Problem 10

A regular hexagon has a side length of 2. Circle Ω centered at O is inscribed inside it. Additionally, another regular hexagon is inscribed in circle Ω . What is the length of the sides of the interior hexagon?

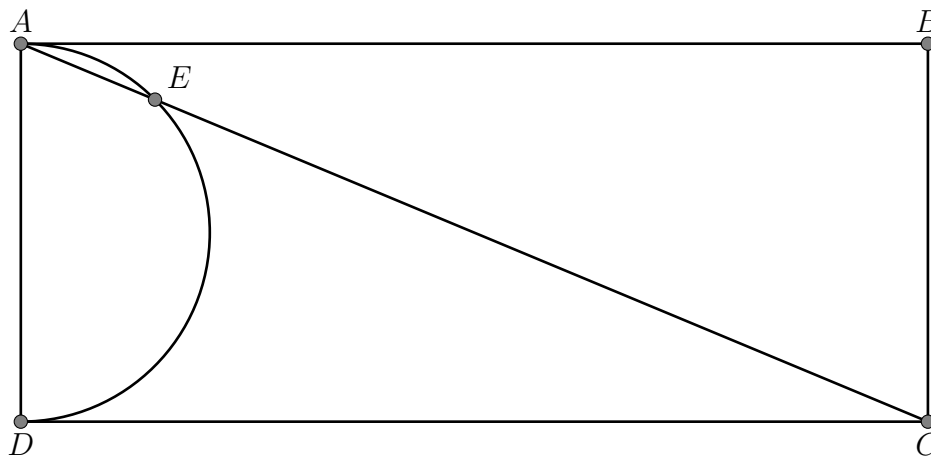


Problem 11

Find the positive integer n that can be expressed as $\sqrt[3]{24 + \sqrt[3]{24 + \sqrt[3]{24 + \dots}}}$.

Problem 12

Let rectangle $ABCD$ have side lengths 5 and 12, where $AB = 12$. Consider a semicircle Ω with diameter AD . Let the intersection of semicircle Ω and AC be E . What is the length of AE ?



Problem 13

A rectangular prism has side lengths equal to the roots of the polynomial $2x^3 - 25x^2 + 80x - 50$. The ratio of its surface area to volume can be written as a common fraction $\frac{p}{q}$ where p and q are relatively prime. Find $p + q$.

Problem 14

Andrea and Bob are playing a game where a player wins when they are 2 points ahead of the opponent. If Andrea has a $\frac{5}{8}$ probability of winning each point and Bob has a $\frac{3}{8}$ probability of winning each point, what is the probability that Andrea wins the whole game?

Problem 15

Suppose we have a rhombus $ABCD$ whose diagonals AC and BD have lengths 6 and 8, respectively. Let the intersection of the diagonals be E . Let the feet of the perpendiculars from E to the sides of the rhombus be F and G , respectively. Find the area of $\triangle EFG$.

