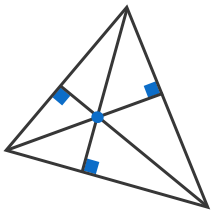


HÖJDPUNKTEN 2026

Högstadietävling - 20 March 2026

UVS MATEMATIKER

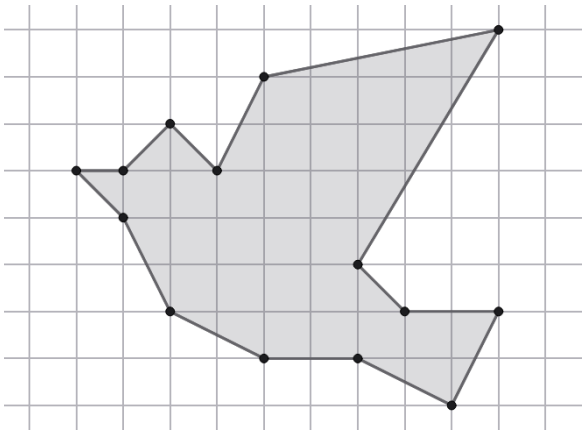
Time allowed: 3 hours
Allowed aids: pen, eraser, compass and ruler only
Each problem is worth 7 points. Full credit requires justification unless otherwise stated.
Answer only one problem per submitted page, and write your team name on each page.

Problem 1. We have started filling out a multiplication table for the three unknown positive integers a, b and c . Fill in the rest. *Only answer required*

	a	b	c
a		65	
b			
c	35		49

Problem 2. How many three digit numbers are there that neither start nor end with 99?

Problem 3. Calculate the area of the shaded region. Every square in the grid has area 1.



Problem 4. A scatterbrained time traveller got stuck in the year 1 A.D with only a broken time machine available. The time machine only has three working buttons, which do the following:

- $(+1)$ — Travel a year forward.
- (-1) — Travel a year backwards.
- $(\times 3)$ — Triple the current year.

The time machine only has energy left for ten button presses. Describe how the time traveller can make it back to the year 2026 A.D. *(Only answer required)*

Problem 5. Let A, B, C and D be the corners of a square in that order. Let P be a point inside the square such that $\triangle ABP$ is an equilateral triangle. How big is the angle $\angle CPD$?

Problem 6. Ida has started a poetry club where members meet and write poems together. At every meeting, each member of the club writes one poem that they put in a joint poetry collection. To the first meeting, only Ida shows up, but more and more members join and no member ever stops showing up. However, there is no meeting where more than one new member joins. After eight meetings, the poetry collection consists of 22 poems, where 14 of them were written at the last four meetings. How many members does the poetry club have, and on which meetings did they join?

Problem 7. John has two lawn mowers named Alfons and Bosse that consume diesel at rates of $8\frac{\text{dL}}{\text{h}}$ and $6\frac{\text{dL}}{\text{h}}$, respectively. To compare the two, he first uses Alfons to cut half the lawn, and then Bosse to cut the other half. In total this took 15 minutes and consumed 1.7 dL of diesel. Which lawn mower consumed the least fuel?

Problem 8. A grocery store has a sale: Buy at least four fruits and get the cheapest one for free. The first customer buys three oranges and one banana. The second one buys three oranges and two lemons. The third one buys two bananas and two lemons. It turns out that all three customers paid exactly 35 kr for their fruits. Fins the price for each individual fruit.

Problem 9. Jakob draws 4 points in the plane such that no three lie on a line. Choose one of these and draw two lines from it to two other points. This creates an angle (we choose the one smaller than 180°). What is the result if we sum all such angles?

Problem 10. The points A, B and C lie on a line in that order such that $|AB| = 2$ and $|BC| = 1$. The point P lies on the circle with diameter AB such that the line PC is tangent to it. Find the area of the region enclosed by the segments BC and CP together with the circular arc between P and B on the circle with diameter AB.

Problem 11. A square carpet is sewn together from square pieces of fabric of which half are large and half are small. The large pieces of fabric are 2×2 dm and the small ones are 1×1 dm. The pieces are sewn together without any overlap. What is the smallest possible size of this carpet?

Problem 12. Find all solutions to the system of equations

$$\begin{cases} p + q + r = s \\ p + 2q + 3r = 5t \end{cases}$$

where p, q, r, s and t are prime numbers.