Shuttle

A1

Compute

$$\frac{2018^4 + 4 \times 2019^4}{2019^2 + 4037^2} - \frac{2019^4 + 4 \times 2018^4}{2018^2 + 4037^2}.$$

(Hint: in both fractions, the denominator is a factor of the numerator.)

Pass on your answer.

A3

T is the number you will receive.

Suppose $a, b, c, d, \in \mathbb{R}, a^2 + b^2 = 2, cd = T$.

Pass on the minimum possible value of $(a - d)^2 + (b - c)^2$.

Shuttle

A2

T is the number you will receive.

N is a positive integer with $(T+1)$ digits of 9, i.e.

$$N = \underbrace{999\ldots9}_{T+1}.$$

Pass on the 2020^{th} digit after the decimal point of $\sqrt{N}$.

A4

T is the number you will receive.

The edges of a tetrahedron are of length T. What is the radius of its circumscribed sphere?