

Eötvös Mathematical Competition 1894

1. Let x and y be integers. Prove that one of the expressions

$$2x + 3y \quad \text{and} \quad 9x + 5y$$

is divisible by 17 if and only if so is the other.

2. Given a circle and two points P and Q , construct a right triangle inscribed in the circle such that its two legs pass through the points P and Q respectively. For what positions of P and Q is this construction impossible?
3. The side lengths of a triangle of area t form an arithmetic progression with difference d . Find the sides and angles of this triangle. Specifically, solve the problem for $d = 1$ and $t = 6$.

