

## Criteria Math Applied to Science Contest (MATS)

## Senior League

Splitting points by tasks 20-40-40
Task №1. 10 points - a reasonable assumption about the ratio of the power of heat flows is introduced, the amount of heat released when the body temperature changes is introduced. 10 points - the equations are correctly written, the formula for time is obtained, the numerical value of the answer is correctly calculated.

Task №2. 20 points for each item. 10 points - the assumption is given that the number of flights is proportional to the radius. 10 points - the proportionality of time and radius is obtained. 10 points - the correct numerical answer is received.b) 10 points - some dependence was obtained linking the changes of time and radius. 10 points - the final expression for the radius depending on time is obtained. Degree obtained.

Task №3. 20 points for each item. a) 10 points - equation for tangent is written (or similar equation), if it is further solved directly and a big and hard expression is obtained without simplifications, then no more than 10 points are given. 10 points - for a reasonable assumption about the neglecting of the quadratic term, the correct approximate numerical answer is obtained. b) 10 points - a tangent calculation error is introduced, an expression for the absolute height calculation error is obtained. 10 points - an approximate expression for error estimation is obtained, the relative error is calculated, some numerical value for some angle from the range is obtained.

A full score is given for the complete solution of the problem. For significant progress in the solution - half of the full score.

