

Sujet n°2

Please do not write on this document and do not forget to hand it back to the jury at the end of the exam.

Quadratic functions

FIGURE 1 – Dunnotar Castle and Royal Deeside, Scotland

The commissioner of Highland Roads and Bridges wants to build a new road between three cities of Scotland : Inverness, Royal Deeside and Moray. This new road should have the shape of a parabola.

The commissioner sketches the situation with a graph in a rectangular coordinate system (the unit is 1 *km* on each axis). The cities have the following coordinates in this grid :

- Inverness $I(0;8)$
- Royal Deeside $D(2;3)$
- Moray $M(4;6)$.

1. Can you find the equation of the parabola?

Hint : You search for a quadratic function. Three simultaneous equations will help you to do so.

2. The river Dee runs close to the city of Royal Deeside. It is represented by the x-axis on the graph of the commissioner. The road must be, at least, at a distance of 1 km of the river Dee. Does the road satisfy this condition?