Modelling

Example

A spear is thrown over level ground from the top of a tower.

The height, in metres, of the spear above the ground after $t$ seconds is modelled by the function: $h\left(t\right)=12.25+14.7t-4.9t^{2},   t\geq 0$

1. Interpret the meaning of the constant term 12.25 in the model.
2. After how many seconds does the spear hit the ground?
3. Write $h(t)$ in the form $A-B\left(t-C\right)^{2}$, where $A, B$ and $C$ are constants to be found.
4. Using your answer to part c or otherwise, find the maximum height of the spear above the ground, and the time at which this maximum height is reached?

Test Your Understanding

A rectangular car park has a perimeter of 184 metres, and the diagonal of the car park measures 68 metres.

(i) By labelling the length of the car park as x metres, formulate an equation and check that x = 32 satisfies the equation. Hence find the dimensions of the car park.

(ii) Sketch the graph of the quadratic expression in part (i), and interpret each intersection with the x-axis in terms of the car park.

Exercise 2H Page 34