Free-Standing Mathematics Qualification
Higher Level

Algebra and Graphs 4988/PM

Preliminary Material

Data Sheet

Specimen Data Sheet

To be opened and issued to candidates one to three weeks prior to the examination

REMINDER TO CANDIDATES

YOU MUST **NOT** BRING THIS DATA SHEET
WITH YOU WHEN YOU SIT THE EXAMINATION.
A CLEAN COPY WILL BE MADE AVAILABLE.

Quadratic Formula

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Cooking time

The cooking time, T minutes, for a joint of lamb weighing W kg is given by the formula

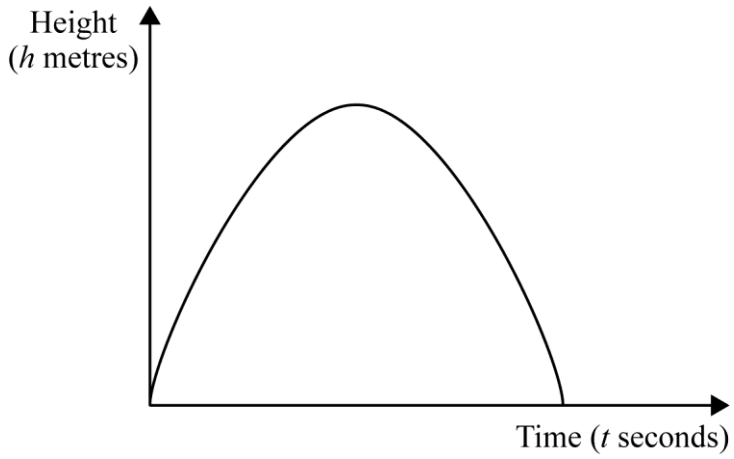
$$T = c + dW$$

where c and d are constants.

The cooking time for a 2 kg joint is 135 minutes.

Cricket ball

A cricket ball is hit into the air. The graph shows its vertical height above the ground.



Its vertical height, h metres, is given by the equation $h = 20t - 5t^2$, where t is the time in seconds after the ball is hit.

The solutions of $at^2 + bt + c = 0$, where $a \neq 0$, are given by $t = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Training loads

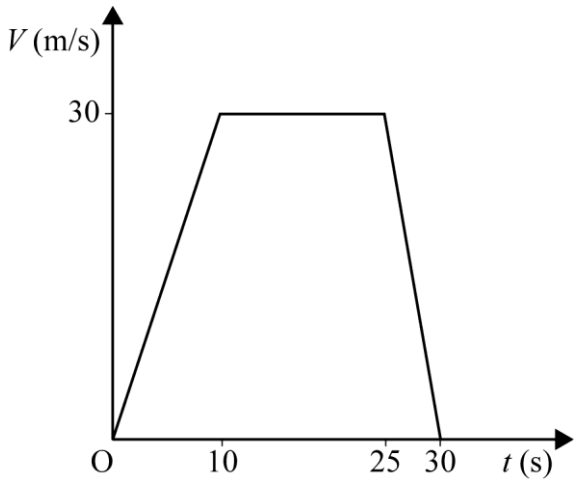
Athletes respond very differently to increases in their training regimes. In general, however, each increase in training produces progressively smaller improvements in performance.

Consider an athlete who, with her usual training, takes 60 minutes to run a fixed distance. If she gradually builds up her training to x times her usual load, she could typically expect to run the fixed distance in T minutes, where

$$T = 55 + \frac{5}{x}$$

Acceleration

The velocity-time graph shown below is for a new car, undergoing a manufacturer's test of acceleration.



The car goes from 0 to 30m/s in 10 seconds.

END OF DATA SHEET