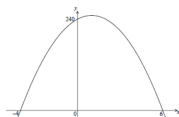


IB Calculus Problem 8

The following figure shows part of the graph of the quadratic function f .

The figure is not to scale.



The x-intercepts are at $(-4; 0)$ and $(6; 0)$ and the y-intercept is at $(0; 240)$.

- A. Write down $f(x)$ in the form $f(x) = -10(x - p)(x - q)$.
- B. Find another expression for $f(x)$ in the form $f(x) = -10(x - h)^2 + k$.
- C. Show that $f(x)$ can also be written as $f(x) = 240 + 20x - 10x^2$.
- D. A particle moves in a straight line such that its velocity v (in ms^{-1}), at time t (in seconds), is given by $v = 240 + 20t - 10t^2$, for $0 \leq t \leq 6$.
 - i. Find the value of t when the velocity of the particle is greatest.
 - ii Find the acceleration of the particle when its velocity is zero.