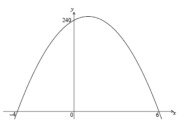
IB Calculus Problem 008



ure shows part of the graph of the quadratic function f.

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 in the form $f(x) = 240 + 20x - 10x^2$.

D. A particle moves in a straight line such that its velocity v (in ms^{-1}), at time t (in seconds), is given by $v = 240 + 20t - 10t^2$, with $0 \leq t \leq 6$.

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.

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