

- 5 The fuel consumption of a car,  $C$  miles per gallon, varies with the speed,  $v$  miles per hour. Jamal models the fuel consumption of his car by the formula

$$C = \frac{12}{5}v - \frac{3}{125}v^2, \text{ for } 0 \leq v \leq 80.$$

- (a) Suggest a reason why Jamal has included an upper limit in his model. [1]
- (b) Determine the speed that gives the maximum fuel consumption. [4]

Amaya's car does more miles per gallon than Jamal's car. She proposes to model the fuel consumption of her car using a formula of the form

$$C = \frac{12}{5}v - \frac{3}{125}v^2 + k, \text{ for } 0 \leq v \leq 80, \text{ where } k \text{ is a positive constant.}$$

- (c) Give a reason why this model is **not** suitable. [1]
- (d) Suggest a different change to Jamal's formula which would give a more suitable model. [2]