7 In this question the unit vectors **i** and **j** are directed east and north respectively.

A canal narrowboat of mass 9 tonnes is pulled by two ropes. The tensions in the ropes are $(450\mathbf{i}+20\mathbf{j})$N and $(420\mathbf{i}-20\mathbf{j})$N. The boat experiences a resistance to motion **R** of magnitude 300 N.

(a) Explain what it means to model the boat as a particle. **[1]**

The boat is travelling in a straight line due east.

(b) Find the equation of motion of the boat. **[2]**

(c) Find the acceleration of the boat giving your answer as a vector. **[1]**