10D Application of Numerical methods in context

1. The price of a car in £s, x years after purchase, is modelled by the function:

   $$f(x) = 15000(0.85)^x - 1000sinx, \quad x > 0$$

a) Use the model to find the value of the car 10 years after purchase

b) Show that $f(x)$ has a root between 19 and 20

c) Find $f'(x)$

d) Taking 19.5 as a first approximation, apply the Newton-Raphson method once to find a second approximation for the time when the value of the car is zero. Give your answer to 3dp

e) Criticise this model with respect to the value of the car as it gets older