**APPLICATIONS TO MODELLING**

**Example 4**

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

$$f\left(x\right)=15 000 \left(0.85\right)^{x}-1000\sin(x),    x>0$$

1. Use the model to find the value, to the nearest hundred £s, of the car 10 years after purchase.
2. Show that $f\left(x\right)$ has a root between 19 and 20.
3. Find $f^{'}\left(x\right)$
4. Taking 19.5 as a first approximation, apply the Newton-Raphson method once to $f(x)$ to obtain a second approximation for the time when the value of the car is zero. Give your answer to 3 decimal places.
5. Criticise this model with respect to the value of the car as it gets older.

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