MS Module 18 Units of measurement practice exam questions

(The attached PDF file has better formatting.)

An actuary in the United States uses least squares regression with N pairs of observations (X_i, Y_i) to estimate average annual claims cost in *dollars* per average distance driven per day in *miles*, giving

annual claim costs (Y) in dollars = $\beta_0 + \beta_1 \times$ distance driven (X) in miles + ϵ, with $\beta_0 = 70$ and $\beta_1 = 13.1$

A European actuary changes the parameters to annual claims costs in Euros and distance driven per day in kilometers. Assume one Euro = 1.66 dollars and 1 kilometer = 0.625 miles.

Question 18.1: β_0

What is β_0 in the European actuary's regression equation?

Answer 18.1: 70 / 1.66 = 42.17

($70 = €42.17)

Question 18.2: β_1

What is β_1 in the European actuary's regression equation?

Answer 18.2: 13.1 × 0.625 / 1.66 = 4.93

(13.1 (dollars/mile) × (0.625 miles per kilometer) / (1.66 dollars per Euro) = 4.93 (Euros/kilometer))