1. The derivative of $\tan^{-1}(x^2)$ w.r.t. x is:

   (a) $\frac{x}{1+x^4}$

   (b) $\frac{2x}{1+x^4}$

   (c) $-\frac{2x}{1+x^4}$

   (d) $\frac{1}{1+x^4}$

2. Overspeeding increases fuel consumption and decreases fuel economy as a result of tyre rolling friction and air resistance. While vehicles reach optimal fuel economy at different speeds, fuel mileage usualy decreases rapidly at speeds above 80km/h.

   The relation btween fuel consumption F(l/100 km) and speed V(km/h)

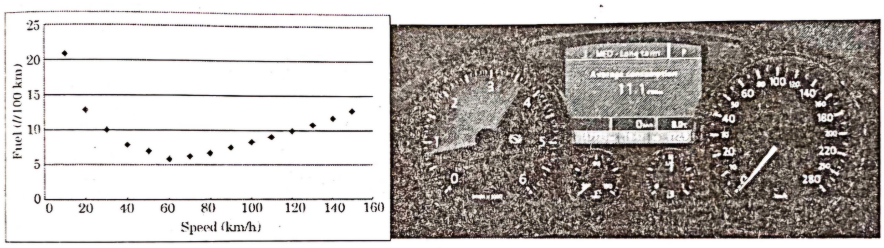

Figure 1: 1

   under some constraints is given as $F = \frac{V^2}{500} - \frac{V}{4} + 14$.
   On the basis of the above information, answer the following questions:

   (i) Find F, when $V = 40km/h$.

   (ii) Find $\frac{dF}{dV}$.

   (iii) Find he speed V for which fuel consumption F is minimum.

   (iv) Find the quantity of fuel required to travel 600 km at the speed V at which $\frac{dF}{dV} = -0.01$.