

Question 6 (8 marks)

Haz Finder is a wheeled autonomous robot that drives over land to investigate locations with hazardous substances, collecting samples of substances where possible.

Figure 5 shows a cross-section of a valley with a hazardous substance located at point O (the lowest point of the valley) and Haz Finder located at point H .

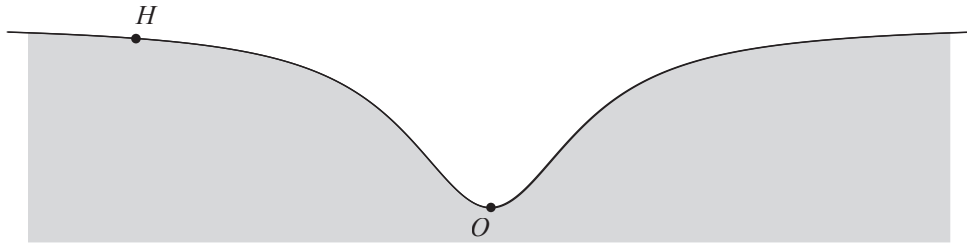


Figure 5

If the origin of the Cartesian plane is located at O , the valley can be modelled by the function

$$y = \frac{8x^2}{x^2 + 20} \text{ for } -20 \leq x \leq 20,$$

where x and y represent the horizontal and vertical displacement measured in metres from O respectively. A graph of this function is shown in Figure 6 where the x -coordinate of point H is $x = -15$.

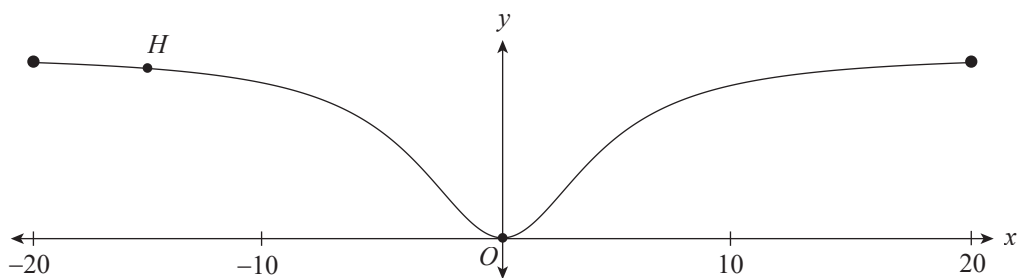


Figure 6

- (a) Show that $\frac{dy}{dx} = \frac{320x}{(x^2 + 20)^2}$.



(2 marks)

