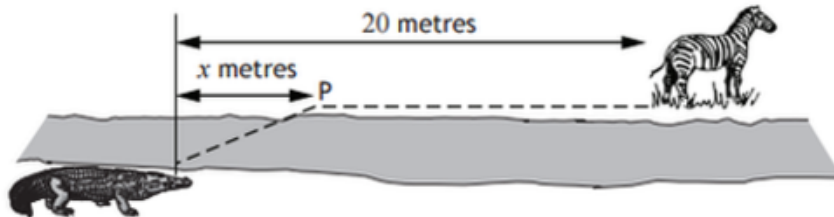


8. A crocodile is stalking prey located 20 metres further upstream on the opposite bank of a river.

Crocodiles travel at different speeds on land and in water.

The time taken for the crocodile to reach its prey can be minimised if it swims to a particular point, P, x metres upstream on the other side of the river as shown in the diagram.



The time taken, T , measured in tenths of a second, is given by

$$T(x) = 5\sqrt{36 + x^2} + 4(20 - x)$$

- (a) (i) Calculate the time taken if the crocodile does not travel on land. 1
- (ii) Calculate the time taken if the crocodile swims the shortest distance possible. 1
- (b) Between these two extremes there is one value of x which minimises the time taken. Find this value of x and hence calculate the minimum possible time. 8