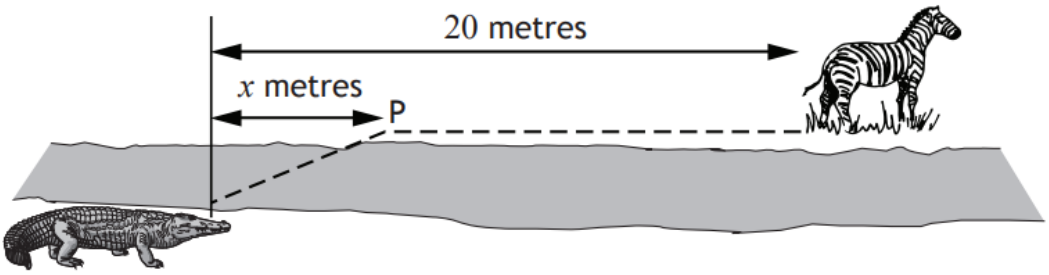
Higher Maths
SQA 2015 Paper 2
Question 8

Higher Maths
Maths.scot

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**

Answers:

(a) (i) 104 tenths of a second, or 10.4 seconds

(ii) 110 tenths of a second, or 11 seconds

(b) 98 tenths of a second, or 9.8 seconds