10.

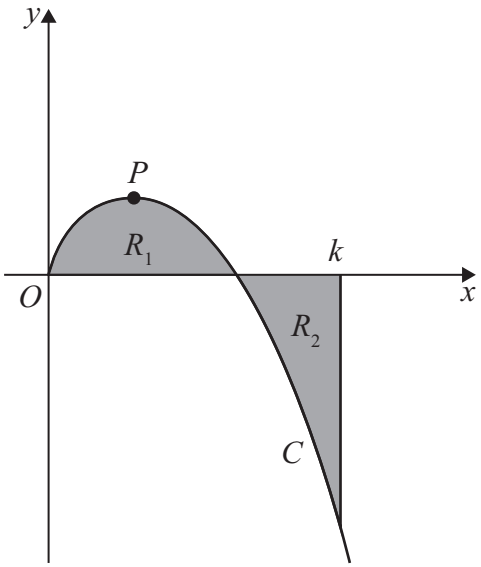

Figure 2

In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

Figure 2 shows a sketch of the curve C with equation

$$y = \frac{\sqrt{x}\left(100 - x^2\right)}{40} \qquad x \geqslant 0$$

The point P is a stationary point on C.

(a) Use algebraic differentiation to find the exact x coordinate of P.

(4)

The region R_1, shown shaded in Figure 2, is bounded by C and the x-axis.

The region R_2, also shown shaded in Figure 2, is bounded by C, the x-axis and the line with equation $x = k$, where k is a constant.

Given that the area of R_1 is equal to the area of R_2

(b) use algebraic integration to find the exact value of k.

(4)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 10 continued

Question 10 continued

(Total for Question 10 is 8 marks)

TOTAL FOR PAPER IS 75 MARKS

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA