10 $f(x) = 32x^3 - 33x + 1$

(a) Show that $f(1) = 0$

(1)

(b) Hence using an algebraic method solve $f(x) = 0$

(4)

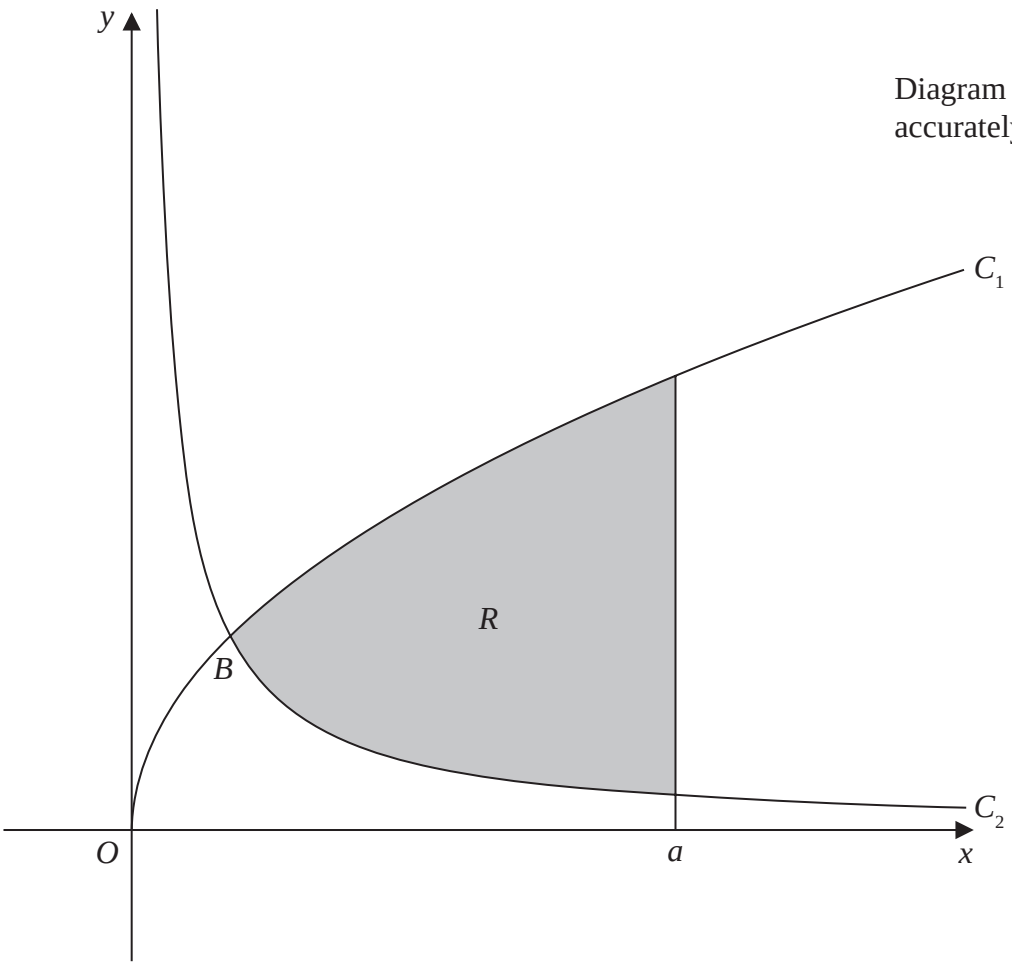

Diagram **NOT** accurately drawn

Figure 4

The region R, shown shaded in Figure 4, is bounded by the curve C_1 with equation $y = \sqrt{x}$, by the curve C_2 with equation $y = \frac{1}{8x}$ and by the line with equation $x = a$

The curves C_1 and C_2 intersect at the point B, with x coordinate p, where $p < a$

(c) Find the value of p.

(2)

The region R is rotated through 360° about the x-axis to generate a solid with volume $\frac{27\pi}{64}$

(d) Use algebraic integration to find the value of a.

(7)

Question 10 continued

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 14 marks)

TOTAL FOR PAPER IS 100 MARKS