8.

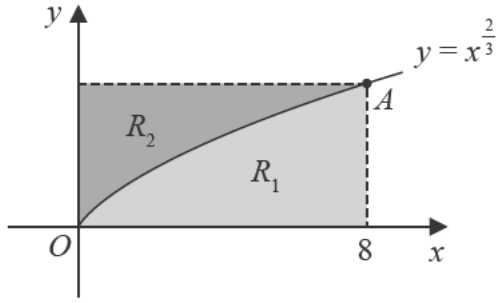

Figure 1

Figure 1 shows a sketch of the curve with equation $y = x^{\frac{2}{3}}$, $x \geqslant 0$

The curve passes through the point A with x coordinate 8
The region R_1 is bounded by the curve, the vertical line passing through A and the x-axis.
The region R_2 is bounded by the curve, the horizontal line passing through A and the y-axis.

The solid V_1 is formed by rotating the region R_1 through 360° about the x-axis.
The solid V_2 is formed by rotating the region R_2 through 360° about the y-axis.

(a) Show that the exact volume of the solid V_1 is $\dfrac{384\pi}{7}$

(4)

The solids V_1 and V_2 are placed in an empty container. A solid is selected at random and then replaced in the container. This is carried out 10 times.

Given that the probability of selecting each type of solid is proportional to its volume,

(b) find, to 4 decimal places, the probability that the solid V_2 is selected exactly 8 times.

(7)