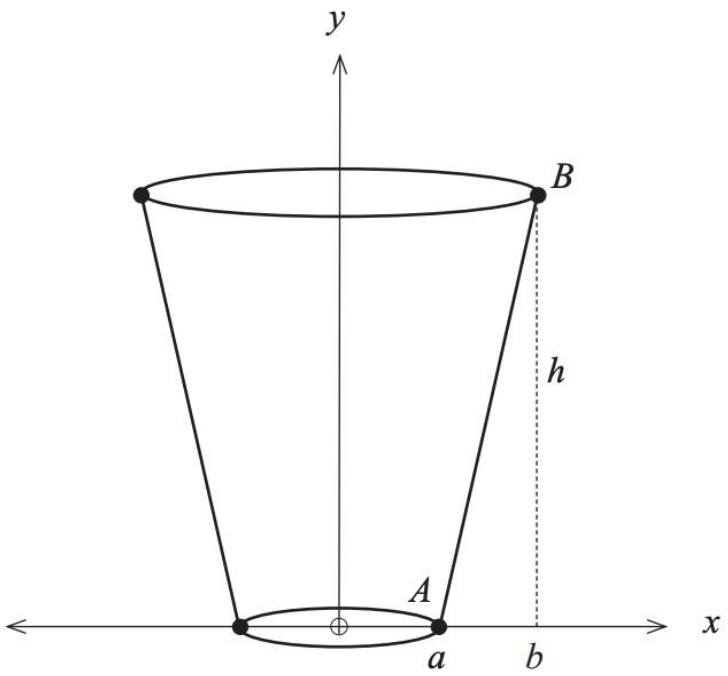
Question 8 **(5 marks)**

The inner surface of a drinking glass can be modelled by rotating the line segment $\overline{AB}$ about the y axis, as shown in the diagram below. The radius of the glass at the bottom is a cm and the radius at the top is b cm. The height of the glass is h cm.



The equation for $\overline{AB}$ is $y = \left(\frac{x-a}{b-a}\right)h$.

(a) Write an expression, in terms of a definite integral, for the volume of liquid contained by the glass when it is full. (2 marks)

(b) By using an anti-derivative, obtain a simplified expression/formula (in terms of a, b and h) for the volume of liquid contained by the glass when it is full. (3 marks)