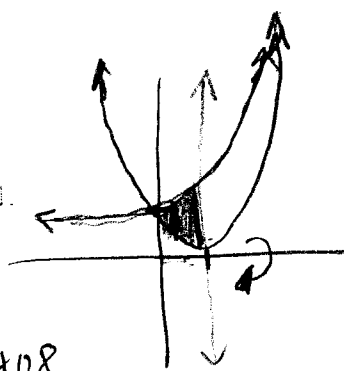


1990 AB 3

Let R be the region enclosed by the graphs of $y = e^x$, $y = (x-1)^2$, and the line $x = 1$.

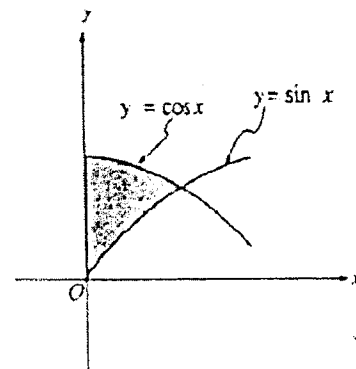


- (a) Find the area of R . $\int_0^1 [e^x - (x-1)^2] dx = 1.385$
- (b) Find the volume of the solid generated when R is revolved about the x -axis. $\pi \int_0^1 [(e^x)^2 - ((x-1)^2)^2] dx = 9.408$
- (c) Set up, but do not integrate, an integral expression in terms of a single variable for the volume of the solid generated when R is revolved about the y -axis.

Shell: $2\pi \int_0^1 x (e^x - (x-1)^2) dx$

1991 BC 3

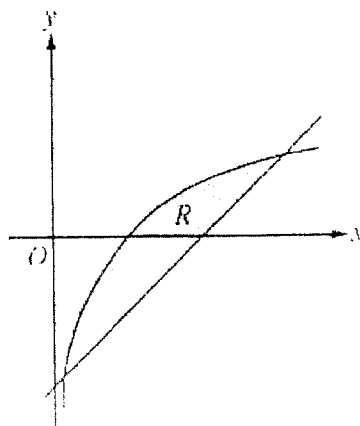
Let R be the shaded region in the first quadrant enclosed by the y -axis and the graphs of $y = \sin x$ and $y = \cos x$, as shown in the figure above.



- (a) Find the area of R .
- (b) Find the volume of the solid generated when R is revolved about the x -axis.
- (c) Find the volume of the solid whose base is R and whose cross sections cut by planes perpendicular to the x -axis are squares.

2006 AB 1

Let R be the shaded region bounded by the graph of $y = \ln x$ and the line $y = x - 2$, as shown above.



- (a) Find the area of R .
- (b) Find the volume of the solid generated when R is rotated about the horizontal line $y = -3$.
- (c) Write, but do not evaluate, an integral expression that can be used to find the volume of the solid generated when R is rotated about the y -axis.