

① Let  $R$  be the region bounded by the curves  $x=y^2$  and  $x=y+6$ .

A) Find the area of  $R$ .

B) Set up an integral for the volume of the solid generated by revolving  $R$  about the  $y$ -axis.

② Find the volume of the solid obtained by revolving the region bounded by the graphs of  $y=x^2$  and  $y=6x-x^2$  about the  $x$ -axis.

③ Find the volume of the solid generated by revolving the region bounded by the graphs of  $y=\frac{1}{3}\ln x$ ,  $y=-\ln x$ , and  $y=1$  around the  $y$ -axis.

④ Find the following limits, by interpreting them as definite integrals:

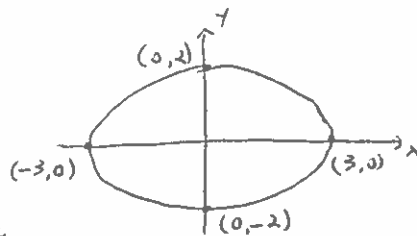
A)  $\lim_{n \rightarrow \infty} \left( \frac{1}{n+1} + \frac{1}{n+2} + \frac{1}{n+3} + \dots + \frac{1}{2n} \right)$

B)  $\lim_{n \rightarrow \infty} \left( \frac{n}{n^2+1} + \frac{n}{n^2+4} + \frac{n}{n^2+9} + \dots + \frac{n}{2n^2} \right)$

⑤ Let  $R$  be the region bounded by the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 1$ .

A) Find the area of  $R$ .

B) Find the volume of the solid generated by revolving  $R$  about the  $x$ -axis.



⑥ The velocity of a particle moving along a line is given by  $v(t) = 3t^2 - 12t$ ,  $t \geq 0$ .

A) Find the net change in the position of the particle from  $t=1$  to  $t=5$ .

B) Find the distance traveled by the particle from  $t=1$  to  $t=5$ .