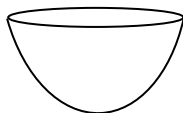
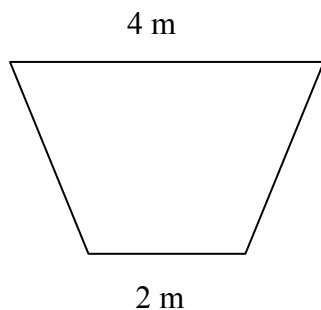


1. A cyclist rides down a long straight road at a velocity (in m/min) given by $v(t) = 400 - 20t$ for $0 \leq t \leq 10$ min.
 - a. How far does the cyclist travel in the first 10 min?
 - b. How far has the cyclist traveled when her velocity is 250 m/min?
2. Find the area of the region bounded by $x = 2y$ and $x = y^2 - 3$.
3. Find the volume of the solid generated by revolving the region bounded by $y = x^2$ and $y = x + 2$ around line indicated.
 - a. The line $x = 3$.
 - b. The line $y = -1$.
4. Find the area of the region bounded by $y = x$ and $y = x^2 - 2$.
5. Find the volume of the solid generated when the region bounded by $y = \ln x$, $y = 0$, and $x = e$, is revolved about the x -axis. Use the disk method. Set up the integrals but do not evaluate.
6. A hemispherical tank with radius 5 m is full of water. Find the work required to pump the water out of the outlet at the top of the tank. The density of water is $\rho = 1000 \text{ kg/m}^3$.



7. Use the method of cylindrical shells to find the volume generated by rotating the region bounded by the curves $y = e^x$, $x = 0$, $y = \pi$ about the x -axis. Set up the integrals but do not evaluate.
8. Find the length of the curve $y = \sqrt{1 - x^2}$ for $-\frac{1}{2} \leq x \leq \frac{1}{2}$.
9. Find the fluid force against the end of a water tank with cross section shown below, the height is 2m, with top edge 4m and bottom edge 2 m.



10. Evaluate

a. $\frac{d}{dx}(\ln(\cos^2 x))$

b. $\frac{d}{dx}\left(\left(\frac{1}{x}\right)^x\right)$

c. $\int_0^{\pi/2} \frac{\sin x}{1 + \cos x} dx$

d. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

e. $\int_0^5 5^{5x} dx$

f. $\int_1^{2e} \frac{3^{\ln x}}{x} dx$

For additional problems, check out the review problems for Chapter 6. Note the questions above are simply a sample of questions possible for the exam; it is possible that other types of questions may appear on your exam.