

Exercises 8.2, Mathematics 1 (12-PHY-BIPMA1)
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1. Find the area bounded by the curve $y = 1 - x^2$, $x \in [-1, 1]$, and the x -axis.
2. Find the area bounded by the curve $y = x(2 - x)$ and the line $y = \frac{1}{2}x$.
3. The cycloid is a curve defined by $x(t) = a(t - \sin t)$ and $y(t) = a(1 - \cos t)$, $t \in [0, 2\pi]$. Find the area bounded by the cycloid and the x -axis. Find the length of the cycloid.
[Hint: To compute the area, use the formula $\int_0^{2\pi} y dx$, where $dx = x'(t)dt$.]
4. Find the volume of the solid of the revolution of the curve $y = \sin x$, $x \in [0, \pi]$ around x -axis.
5. Find the length of the curve $y = \ln(\cos x)$, $x \in [0, \frac{\pi}{3}]$.
6. Find the length of the parabola $y = x^2$, $x \in [0, 1]$.