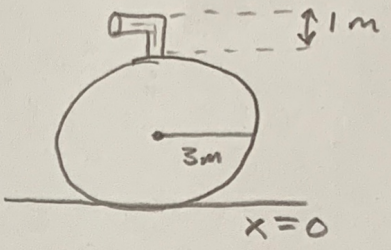
§6.4 Work Quiz

ZED CHANCE

Find work required to empty tank of water:



$$W = 9800\pi \int_0^6 (6x - x^2)(7 - x)\,dx$$

$$= 9800\pi \int_0^6 42x - 6x^2 - 7x^2 + x^3\,dx$$

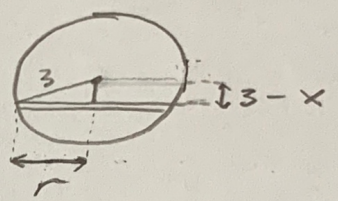
$$= 9800\pi \int_0^6 42x - 13x^2 + x^3\,dx$$

$$= 9800\pi \left[21x^2 - \frac{13}{3}x^3 + \frac{1}{4}x^4\right]_0^6$$

$$= 9800\pi [756 - 936 + 324 - (0 - 0 + 0)]$$

$$= 9800\pi [144]$$

$$= 1{,}411{,}200\pi \text{ J of work}$$



$$r = \sqrt{3^2 - (3 - x)^2}$$

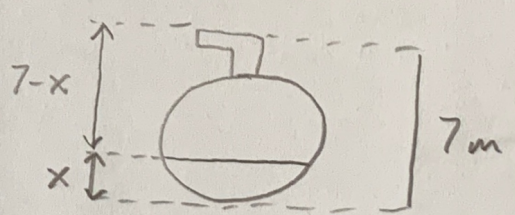
$$= \sqrt{9 - (9 - 6x - x^2)}$$

$$= \sqrt{6x - x^2}$$

$$V = \pi r^2\,dx$$

$$= \pi\left(\sqrt{6x - x^2}\right)^2 dx$$

$$= \pi(6x - x^2)\,dx$$



Displacement = $7 - x$

$$m_w g = (9.8)(1000)$$

$$= 9800$$