

1. Find the area of the regions between the graphs of $f(x) = 2 - x^2$ and $g(x) = -2$ on the interval $[-2,4]$.
2. Find the volume generated by revolving the region between $y = 10 - x^2$ and $y = 1$ **about the line $y = 0$** .
3. Find the volume generated by revolving the region bounded by $y = \sqrt[3]{x}$, $y = 0$, and $x = 8$ **about the line $x = 8$** .

4. Find the arc length of Find the arc length of $y = \frac{x^3}{3} + \frac{1}{4x}$ on the interval $[2, 3]$.

5. Find the area of the surface obtained by revolving the curve $y = 5\sqrt{2x+3}$ about the x-axis on the interval $[0, 2]$.

6. A reserve water cistern in the shape of a right *circular cone* which is 40 ft. across its top and 100 feet high must be used to provide water for a parched farm. Find the work required to pump all of the water out of the tank.

7. Find the work required to raise a bucket from which water is leaking at a rate of .25 lbs/sec, **until 8 pounds of water have leaked out**, if the bucket is being raised at 2 ft/sec. The water originally weighs 10 lbs. and the bucket weighs 4 lbs.

8. A force of 10 lbs is needed to stretch a spring 6 inches. Find the work done in compressing the spring from a compressed length of 2 inches to a compressed length of 6 inches.

9. Find the center of mass of the region between $y = x^2$ and $y = x^5$ on $[0, 1]$.

10. Find the center of mass for the point masses listed at their respective coordinates in the table below.

mass	10	9	8	9	10
location	(-5, -2)	(3, 7)	(-2, 0)	(-8, -3)	(0, 1)

11. The ends of a water trough, which is full of water, have the shape of the region bounded by the graphs of $y = |3x|$ (or $y = 16x^2$) and $y = 16$. Find the force against one end of the tank.