

Some problems to set up (and evaluate) volumes/arclengths/surface areas

For each of the functions defined on the indicated intervals, *set up but do not evaluate!* the integrals which will compute:

- (a) the volume when the region between the graph and the x -axis is revolved around the x -axis (by slices)
- (b) the volume when the region between the graph and the x -axis is revolved around the line $y = -2$ (by slices)
- (c) the volume when the region between the graph and the x -axis is revolved around the y -axis (by shells)
- (d) the arclength of the graph
- (e) the area of the surface obtained by revolving the graph around the x -axis

A1. $y = f(x) = 2x - x^2$ from $x = 0$ to $x = 2$

A2. $y = f(x) = \ln x$ from $x = 1$ to $x = 3$

A3. $y = f(x) = \cos x$ from $x = \pi/2$ to $x = 3\pi/2$

A4. $y = f(x) = \sqrt{2x - x^2}$ from $x = 0$ to $x = 2$

A5. $y = f(x) = e^x$ from $x = 0$ to $x = 3$

A6. $y = f(x) = \frac{1}{x}$ for $x = 1$ to $x = 4$

Compute the integrals you have created!, for the problems

A1(a) , A1(c) , A1(d)

A2(c) , A2(d)

A3(a) , A3(e)

A4(a) , A4(d) , A4(e)

A5(b) , A5(c) , A5(e)

A6(a) , A6(c) , A6(e)

Write out and hand in your setup and evaluation for A2(c) , A3(e), A5(b), and A5(e)