

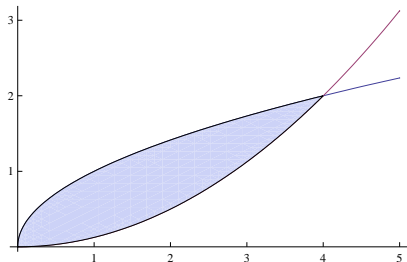
Note: in accordance with requests to limit the scope of the exam, this practice exam does not, nor will the actual exam, cover sections 7.7 and 7.8. You will, however, be expected to know these sections for Quiz #3 and Exam #2.

This test is closed-book and closed-notes. No calculator is allowed for this test. For full credit show all of your work (legibly!), unless otherwise specified.

The problems are in no particular order, and it is suggested that you look at all of them before beginning to answer any.

1. (10 points) The region shown below is the area between the curves $y = \sqrt{x}$ and $y = \frac{1}{8}x^2$.

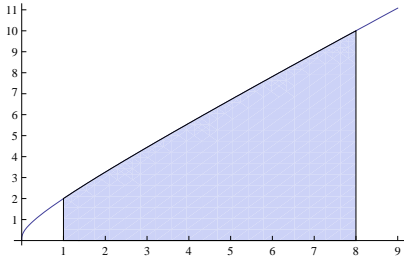
- (a) (5 points) Find the area of this region.



- (b) (5 points) Find the volume of the solid produced by rotating this region around the x -axis.

2. **(15 points)** The region shown below is the area under the curve $y = x + \sqrt[3]{x}$ from $x = 1$ to $x = 8$.

- (a) **(5 points)** Construct, but do not evaluate, an integral representing the volume of the solid produced by rotating this figure around the x -axis.



- (b) **(5 points)** Construct, but do not evaluate, an integral representing the volume of the solid produced by rotating this figure around the line $x = -2$.

- (c) **(5 points)** Calculate the average value of the function $f(x) = x + \sqrt[3]{x}$ on the interval $[1, 8]$.

3. **(15 points)** Evaluate the following integrals:

(a) **(5 points)** $\int x^2 \sec^2(x^3) dx.$

(b) **(5 points)** $\int_0^{\pi/2} \sin \theta \cos^3 \theta d\theta$

(c) **(5 points)** $\int (4t - 10)e^{(t^2 - 5t + 3)} dt$

4. **(20 points)** Evaluate the following integrals:

(a) **(10 points)** $\int (3x + 1)e^{-x} dx$

(b) **(10 points)** $\int (x^2 - 1) \sin x dx$

5. **(20 points)** Evaluate the following integrals:

(a) **(10 points)** $\int t\sqrt{t^2 - 4}dt$

(b) **(10 points)** $\int x^3\sqrt{25 - x^2}dx$

6. **(20 points)** Evaluate the following integrals:

(a) **(10 points)** $\int \frac{t^2 - 4t - 2}{t(t+1)(t-2)}dt$

(b) **(10 points)** $\int \frac{dx}{x^2 + 8x + 25}$