

YOUR NAME: \_\_\_\_\_

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the following integrals:

(a)  $\int (\sqrt{x} - x) \sqrt[3]{x} \, dx =$

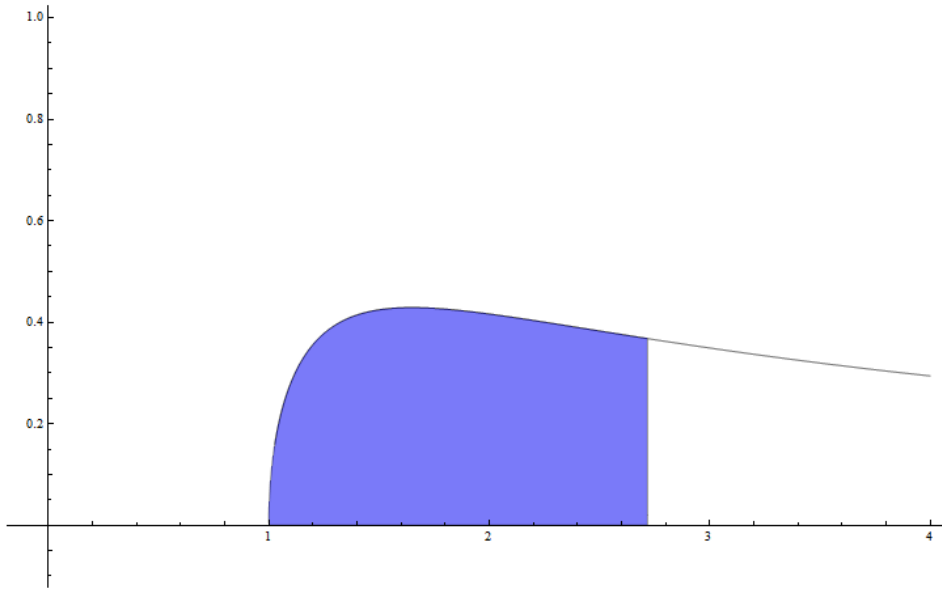
(b)  $\int \frac{4x^6 + 3x - 7}{x^2} \, dx =$

2. A culture of bacteria is growing at the rate of  $20e^{0.8t}$  cells per day, where  $t$  is the number of days since the culture was started. Suppose that the culture began with 50 cells. Find a formula for the total number of cells in the culture after  $t$  days.

3. Find the area of the region enclosed by the two curves

$$f(x) = 7x, \quad g(x) = x^2 + 6.$$

4. Compute the area under the graph of  $f(x) = \frac{\sqrt{\ln x}}{x}$  from  $x = 1$  to  $x = e$ .



5. Use by-parts to calculate the integral

$$\int x e^{(1/5)x} dx.$$