

Name _____

Period _____

Calculus BC – Chapter 6 Sample Test (calculators allowed)

Show all work for free-response questions.

1. Let R be the region enclosed by the graph of $y = 1 + \ln(\cos^4 x)$, the x -axis, and the vertical lines $x = -\frac{2}{3}$ and $x = \frac{2}{3}$. The closest integer approximation of the area of R is

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

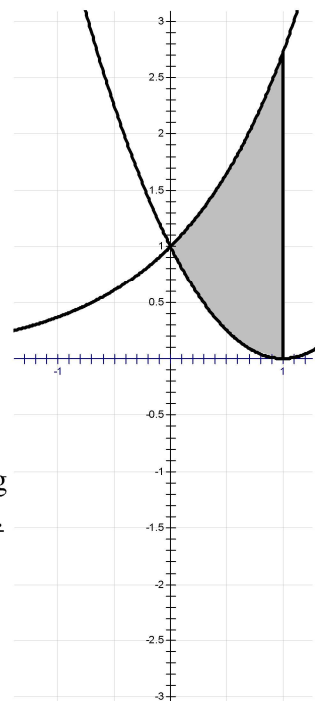
2. The base of a solid S is the region enclosed by the graph of $y = \sqrt{\ln x}$, the vertical line $x = e$, and the x -axis. If the cross sections of S perpendicular to the x -axis are squares, then the volume of S is

(A) $\frac{1}{2}$ (B) $\frac{2}{3}$ (C) 1 (D) 2 (E) $\frac{1}{3}(e^3 - 1)$

3. Let R be the region enclosed by the graphs of $y = e^x$, $y = (x - 1)^2$, and the vertical line $x = 1$.

a) Find the volume of the solid generated when R is revolved about the x -axis.

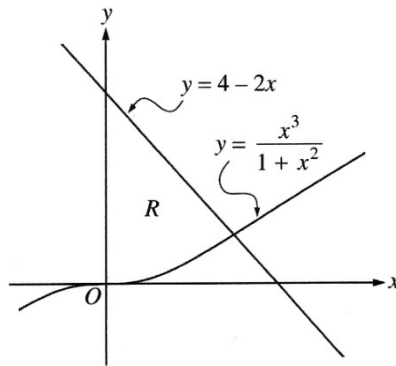
b) The base of a solid is the region R . Each cross section of the solid perpendicular to the x -axis is a semicircle. Write an expression involving one or more integrals that gives the volume of the solid. Do not evaluate.



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4. Let R be the region bounded by the graphs of $y = e^x$ and $y = -x^2 + 1$.
- a) Find the area of R .

b) Write an expression involving one or more integrals that gives the length of the boundary of the region R . Do not evaluate.



5. Let R be the region bounded by the y -axis and the graphs of $y = \frac{x^3}{1+x^2}$ and $y = 4 - 2x$, as shown in the figure above.

a) The region R is the base of a solid. For this solid, each cross section perpendicular to the x -axis is a square. Find the volume of this solid.

b) Set up, but do not integrate, an integral expression in terms of a single variable for the volume of the solid generated when region R is revolved about the horizontal line $y = -1$.

Name _____

Period _____

Calculus AB – Chapter 6 Sample Test (no calculators)

Show all work for free-response questions.

1. The area of the region enclosed by the graph of $y = x^2 + 1$ and the horizontal line $y = 5$ is

- (A) $\frac{14}{3}$ (B) $\frac{16}{3}$ (C) $\frac{28}{3}$ (D) $\frac{32}{3}$ (E) 8π

2. Find the area of the region bounded by $y = e^x$, $y = e^{-x}$, and the vertical line $x = 1$.

(A) $e + \frac{1}{e} - 2$

(B) $e - \frac{1}{e}$

(C) $e + \frac{1}{e}$

(D) $2e - 2$

3. Find the average value of $f(x) = 1 - \frac{1}{1+x^2} + \sqrt{1-x^2}$ from $x = -1$ to $x = 1$.

4. On a certain day, the temperature, in degrees Fahrenheit, in a small town t hours after midnight ($t = 0$) is modeled by the function $g(t) = 50 - 8 \sin\left(\frac{\pi t}{12}\right)$. What is the average temperature of the town between 3am ($t = 3$) and 6am ($t = 6$), in degrees Fahrenheit?