

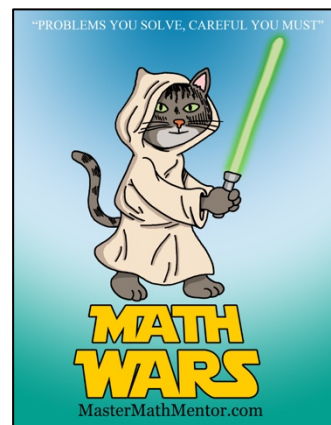
Math Wars – AB Calculus

Scrambled 171 – Integrals and Applications



Maximum Time: 8.25 Minutes

Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url: <https://mastermathmentor.com/mmm/mathwars.ashx?key=171>



When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many problems you got right and your time. A perfect score is all problems correct using half the maximum time or less. You can text or email your friends with your results.

1. (1 pt) $\int \frac{x}{x^4 + 10x^2 + 25} dx =$

A. $\frac{2}{x^2 + 5} + C$

B. $\frac{-1}{2(x^2 + 5)} + C$

C. $\frac{-1}{2(x^2 + 5)^3} + C$

D. $\frac{-2}{(x^2 + 5)^3} + C$

2. (3 pts) The function $f(x)$ is continuous on the interval $[-8, 4]$.

Selected values of x and $f(x)$ are given in the table below. If

x	-8	-5	-2	1	4
$f(x)$	-6	-8	-3	4	-2

$\int_{-8}^4 f(x) dx$ is approximated with left Riemann sums with 4 equal

subintervals, right Riemann sums with 4 equal subintervals, 4 trapezoids with 4 equal subintervals, and 2 midpoint rectangles with 2 equal subintervals, what is the difference between the largest and smallest approximation?

A. 6

B. 9

C. 12

D. 15

3. (5 pts) The graph of the function f is shown to the right. Let g be the continuous

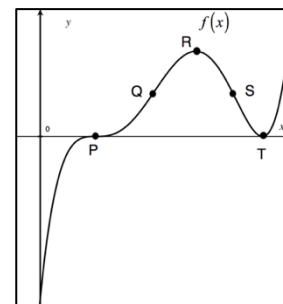
function defined by $g(x) = \int_0^x f(t) dt$. For what value of x does g have an inflection point?

A. Q and S

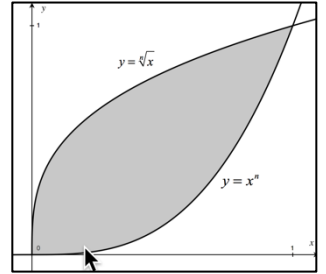
B. P, Q, and S

C. R and T

D. P, R and T



4. (7 pts) The figure on the right shows the curves $y = x^n$, $y = \sqrt[n]{x}$, $n > 1$. Find the area of the shaded region:



- A. 1
- B. $\frac{n}{n+1}$
- C. $\frac{n-1}{n+1}$
- D. $\frac{1}{n+1}$
5. (9 pts) Two brother cats, Newton and Fanucci are adopted from the same shelter at the same time and each weighs 6 pounds. Fanucci eats both wet food and dry food while Newton only eats dry food. For a period of 2 years, each cat's weight increases proportionally to itself with Fanucci's constant of proportionality being 30% while Newton's is 10%. After 2 years, Fanucci's weight will be approximately what percentage greater than Newton's?
- A. 33%
- B. 49%
- C. 67%
- D. 75%