• Name.................................... • Number.................... • Section....................

Question 1. *(10 points)* Circle the best answer or write your answer in the designated area (in each case, show your work).

1. For $x > 0$, $\int \left(\frac{1}{2x} \int_1^x \frac{du}{u} \right) dx =$

   a) $\frac{1}{x^3} + C$

   b) $\ln(\ln x) + C$

   c) $\frac{(\ln x)^2}{4} + C$

   d) $\frac{\ln(x^2)}{4} + C$

2. If $f(x) = (x^2 + 1)^{(2-3x)}$. Then $f'(1) =$

   a) $-\ln(8e)$

   b) $-\frac{1}{2}\ln(8e)$

   c) $-\frac{3}{2}\ln(2)$

   d) $-\frac{1}{2}$

3. $\sec^{-1} 4 + \sin^{-1} \frac{1}{4} =$

   a) $\frac{\pi}{4}$.

   b) $-\frac{\pi}{2}$.

   c) $\frac{\pi}{2}$.

   d) $-\frac{\pi}{4}$.

4. $\lim\limits_{x \to \infty} x^{\frac{1}{\sqrt{x}}}$

   a) 1

   b) 0

   c) -1

   d) ∞

5. Find $\lim\limits_{x \to 2} \dfrac{\int_2^x \cos t\, dt}{x^2 - 4}$ and write your answer below.

Your answer

6. Evaluate $\int_0^{\frac{\sqrt{3}}{2}} \dfrac{1 + x^3}{\sqrt{1 - x^2}}\, dx$ and write your answer below.

Your answer

7. A puppy weighs 2 pounds at birth and 3.5 pounds two months later. If the weight of the puppy during it's first 6 months is increasing at a rate proportional to it's weight, then how much will the puppy weigh when it's 3 months old .

a) 4.6 pounds.

b) 5.6 pounds.

c) 6.5 pounds.

d) 7.5 pounds.

8. $\int_0^{\frac{\pi}{4}} \dfrac{2e^{\tan x}}{\cos^2 x}\, dx =$

a) 2

b) $2e^{-1}$

c) $2e - 2$

d) $2e + 2$

9. Which of the following functions grow faster than $\ln x$ as $x \to \infty$:

a) $\dfrac{1}{x}$.

b) $\ln \sqrt{x}$.