

	Possible points	Your mark
A	35	
B	30	
C	10	
D	10	
E	15	
total	100	

Name \_\_\_\_\_

SSN \_\_\_\_\_

- (1) For credit, Show all your work and put your answers in provided box.
- (2) No calculators allowed. No “formula sheets” allowed.
- (3) During the exam, do not leave your seat. If you have a question, raise your hand.
- (4) When you finish, turn your exam over, put your pencil down, and raise your hand.  
Do not leave your seat.
- (5) Make sure that you have all 6 pages.

A. Find  $\frac{dy}{dx}$  for:

(A1)  $y = \arctan x$

$\frac{-}{4}   A1$
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(A2)  $y = 2^x$

$\frac{-}{4}   A2$
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(A3)  $y = e^x$

$\frac{-}{4}   A3$
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(A4)  $y = x^e$

$\frac{-}{4}   A4$
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(A5)  $y = e^e$

$\frac{-}{4}   A5$
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$$(A6) \ y = x^x$$

$\frac{-}{5} \mid A6$
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$$(A7) \ y = \frac{x^2 \sin x}{\sqrt{x+5} e^2}$$

$\frac{-}{5} \mid A7$
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$$(A8) \ ye^x + xe^y = 3$$

$\frac{-}{5} \mid A8$
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B. Evaluate.

$$(B1) \int_{-1}^{\sqrt{3}} \frac{dx}{1+x^2} =$$

$$\frac{1}{5} \Big|^{B1}$$

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$$(B2) \int \frac{\log_5(x^2)}{x} dx =$$

$$\frac{1}{5} \Big|^{B2}$$

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$$(B3) \int \cos^3 2x dx =$$

$$\frac{1}{5} \Big|^{B3}$$

$$(B4) \int \frac{\cot^3 x}{\tan x} dx =$$

$$\frac{5}{5} \Big|_{B4}$$

$$(B5) \int \sin(\ln x) dx =$$

$$\frac{10}{10} \Big|_{B5}$$

C. Graph  $y = 3^x$ . The inverse of  $y = 3^x$  is the function  $y =$  . Graph the inverse function of  $y = 3^x$ . Be sure to label your functions.

D.(a) Express, as an integral, the area  $A$  under the graph  $y = \frac{1}{t}$  from  $t = 1$  to  $t = 2$ . (b) Compute this area, i.e. evaluate the definite integral in (a).

<i>Answer</i> (a) $A = \int$
(b) $A =$

E. We know that radioactive substances follow the exponential growth and decay equation. What is the half-life of a certain radioactive substance if it takes 5 years for two-thirds of this substance to decay?

Answer: \_\_\_\_\_ years.