Work individually. To receive full credit, any work that leads to your answers must be clearly shown. Correctly label all functions! NO calculators.

1. Given \( f(x) = 2(2x - 1)^3 \) and \( f'(x) = 12(2x - 1)^2 \).
   a) Find \( f(1) \) and \( f'(1) \). (1 pt. each)

   \[ f(1) = \] 
   \[ f'(1) = \]

   b) Write the equation of the tangent line to \( f \) at the point where \( x = 1 \). (4 pts.)

   b) 

Find the derivative of the following functions. CLEARLY show any work!! (5 pts. each)

2. \( y = \ln(6t + 2) \) (4 pts.)

   2) 

3. \( y = \sqrt{5x^2 - 7} \) (6 pts.)

   3) 

4. \( y = e^{-4t^2} \) (4 pts.)

   4)
1. The graph of the function \( f(t) = 2^t \) is given below. Estimate the value of \( \int_0^2 2^t \, dt \) by counting the number of grid squares. (4 pts.)

2. The graph of a function \( f \) is given below. Do parts a) & b) to estimate \( \int_0^6 f(x) \, dx \).

a) i) On the graph draw rectangles representing a Riemann sum using a left-hand sum with \( \Delta t = 3 \). (2 pts.)
ii) Then calculate the value of the sum. Show all numbers being added in the sum!! (3 pts.)

b) i) On the graph draw rectangles representing a Riemann sum using a right-hand sum with \( \Delta t = 2 \). (Note the different \# of rectangles). (2 pts.)
ii) Then calculate the value of the sum. Show all numbers being added in the sum!! (3 pts.)

3. Refer to the following graph to answer the following. (2 pts. each)

a) \( \int_{2.3}^4 f(x) \, dx = \) __________

b) \( \int_0^4 f(x) \, dx = \) __________

c) total area = __________
Clearly and correctly show all work that leads to your answers. In order to receive full credit use correct notation and show all necessary steps.

1. Suppose \( C(t) \) represents the daily cost to heat your home in dollars per day and \( t \) is days since January 1, 2010. Write a complete, correct English sentence to interpret the meaning of \( \int_{0}^{90} C(t) \, dt \). Include correct units. (5 pts.)

Find the following indefinite integrals. (Remember the constant!) (5 pts. each)

2. \( \int x^{1/3} \, dx \)

3. \( \int \left( 8x^3 + \frac{1}{x} \right) \, dx \)

4. \( \int 12e^{-3t} \, dt \)