Your Name: ____________________________

On this exam, you may use a calculator.

1 (13) _______
2 (13) _______
3 (13) _______
4 (13) _______
5 (13) _______
6 (13) _______
7 (13) _______
8 (13) _______
9 (13) _______
10 (13) _______
11 (13) _______
12 (13) _______
Total (156) _______
1. Evaluate the Riemann sum for the function \( f(x) = \frac{1}{x} \) in the interval \([1, 3]\) with \( n = 4 \). Use the left end points.

- a) 1.098
- b) 1.352
- c) 1.283
- d) 2.076

2. A winning lottery ticket pays either 30 annual installments of $30000 each or a lump sum payment of $450000. If the prevailing compounded interest rate is 6%, which one would you choose?

- a) the lump sum payment
- b) the annuity plan
- c) neither
3. The supply function for a given product is \( S(x) = \sqrt{36 + 1.8x} \). Determine the producers surplus, if the market price is set at $9 per unit.

- a) 25
- b) 32
- c) 38
- d) 35

4. Compute the area of the region completely enclosed by the curves \( y = x^2 \) and \( y = 4x - x^2 \).

- a) 3
- b) 8/3
- c) 12
- d) 2
5. Compute the integral
\[ \int_{0}^{1} \frac{3x}{\sqrt{x} + 1} \, dx \]
- a) \(2\sqrt{2}\)
- b) \(-2\sqrt{2}\)
- c) \(4 + 2\sqrt{2}\)
- d) \(4 - 2\sqrt{2}\).

6. Compute the integral
\[ \int \frac{\ln(x)^5}{x} \, dx \]
- a) \(\ln(x)^6\)
- b) \(\ln(x)^6/6\)
- c) \(\ln(x)^5\)
- d) \(\ln(x)^5/6\)
7. The management of the City Transit Authority has determined that the number of passengers will increase at the rate of

\[ 3000(1 + 0.4t)^{-1/2} \]

per month \( t \) months from now. If 100000 are currently using the system, find the formula for the number of commuters that will be using the system \( t \) months from now.

- a) \( 100000\sqrt{1 + 0.4t} \)
- b) 100000
- c) \( 100000 + \sqrt{1 + 0.4t} \)
- d) \( 85000 + 15000\sqrt{1 + 0.4t} \).

8. Compute the integral

\[ \int_{1}^{e} \frac{\ln(x^2)}{x} \, dx \]

- a) 1
- b) 0.8
- c) 0.5
- d) 2
9. Compute the integral
\[ \int x^2 e^{x^3} \, dx \]

- a) \( x^3 e^{x^3} \)
- b) \( x^2 e^{x^3}/3 \)
- c) \( e^{x^3} \)
- d) none of the above

10. Find the average value of the function
\[ f(x) = x(x^2 + 16)^{-1/2} \]
over the interval \([0, 3]\).

- a) \( 1/3 \)
- b) \( 1 \)
- c) \( 0.5 \)
- d) \( 0.7 \)
11. An investor will invest $300 per three months for the next ten years with a continuous rate of return $r = 8\%$. What will be the amount accumulated at the end.

- a) $18383$
- b) $8260$
- c) $12450$
- d) $13458$

12. An entrepreneur would like to borrow certain amount of money to invest in his operation. He decides he could repay back at most $1000 per month for the next ten years with an anticipated continuous rate of return $r = 8\%$. What is the maximal amount he will be able to borrow?

- a) $183830$
- b) $82600$
- c) $124500$
- d) $134580$