Show all work. Circle your answer.
No books, no notes, no calculator, no cell phones, no pagers, no electronic devices at all.
Solutions will be posted shortly after the exam: www.math.wisc.edu/~miller/m213

Name______________________________

Circle your DIScussion section (column one):

TA: Youngsuk Lee

| DIS 301 | 8:50 T | 6322 SOC SCI |
| DIS 302 | 8:50 R | 215 INGRAHAM |
| DIS 303 | 9:55 T | 225 INGRAHAM |
| DIS 304 | 9:55 R | 495 VAN HISE |

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1. (10 pts) Suppose the supply function for some commodity in dollars is given by

\[ S(q) = 1 + 2q \]

and the demand function is given

\[ D(q) = 16 - q^2 \]

(a) Graph the supply and demand curves.
(b) Find the point at which supply and demand are in equilibrium.
(c) Find the consumer’s surplus, CS.
(d) Find the producer or supplier surplus, SS.
(e) Shade and label the appropriate areas for these in your graph.
2. (8 pts)
   (a) Approximate the definite integral $\int_0^2 e^{x^2} \, dx$ with $n = 3$ subintervals and using the midpoint of each subinterval for $x_k$.
   (b) Use the Trapezoid rule to approximate the same integral with the same subintervals.

   Circle your answer.
3. (8 pts) Find

\[ \int \ln(x + 1) \, dx \]

Circle your answer.
4. (8 pts) Find

\[ \int \frac{e^{\sqrt{z}}}{\sqrt{z}}\, dz \]

Circle your answer.
5. (8 pts) Find

\[ \int e^x (x + 1) \, dx \]

Circle your answer.
6. (8 pts) Evaluate the integral
\[ \int_{0}^{1} \frac{dx}{2x + 1} \]

Circle your answer.
Answers

1. equilibrium at $q = 3$, $p = 7$, $CS = 18$, $SS = 9$

2.  
   (a) $\frac{2}{3}(e^\frac{1}{9} + e + e^\frac{25}{9})$  
   (b) $\frac{2}{3}(\frac{1+e^4}{2} + e^\frac{4}{9} + e^\frac{16}{9})$

3. $(x + 1) \ln(x + 1) - x + C$

4. $2e^{\sqrt{z}} + C$

5. $xe^x + C$

6. $\frac{1}{2} \ln 3$