Brief Article

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This exam is worth a total of 100 points. There are 11 problems – 8 multiple choice and 3 partial credit. Each multiple choice problem is worth 7 points. Point values are assigned next to the partial credit problems. Please show all work on the partial credit section of the test inside the test booklet. Use the front sheet to answer the multiple choice section by putting a $\boxed{\times}$ in the appropriate box. You will have until 9:20am to complete the exam. Good luck!

Sign your name

6=2.5in =0.8cm =1cm =0.4cm=1 Evaluate $\int x^2 + \frac{1}{3}e^{-2}\ e^{-2}\ \infty\ 1\ 3e^{-2}$
$3\sin(2x)\,dx$.

$\frac{1}{3}x^3 - 3\cos(2x) + C$ $\frac{1}{3}x^3 - \frac{3}{2}\cos(2x) + C$ $\frac{1}{3}x^3 +$
$\frac{3}{2}\cos(2x)+C$ $3x^3 - 3\cos(2x)+C$ $3x^3+6\cos(2x)+$
C

Evaluate $\int \ln x\,dx$

$x\ln x - x + C$ $\frac{1}{x} + C$ $\frac{1}{2}(\ln x)^2 + C$ $\frac{\ln x}{x} + C$ $\frac{e^x}{x} + C$

The marginal cost function for a company is given
by $MC(x) = 3x^2 - 17x + 2000$. If the fixed costs
for the company are $12,000, what is the total
cost function C(x)?

$x^3 - \frac{17}{2}x^2 + 2000x - 12,000$ $3x^3 - 17x^2 + 2000x -$
$12,000$ $x^3 - \frac{17}{2}x^2 + 2000x + 12,000$ $x^3 - \frac{17}{2}x^2 +$
$2000x$ It cannot be determined from the infor-
mation provided.

Consider the following graph of the supply curve,
S(q), and the demand curve, D(q) for a cer-
tain item. Which region/regions denoted on the
graph correspond to the consumer's surplus?

A+B B A A+B+C B+C

Determine the average value of the function $y =$
$\cos x$ between $x = 0$ and $x = \frac{\pi}{2}$.

2 0 2π $\frac{\pi}{2}$ $\frac{2}{\pi}$

Find the area underneath the curve $y = e^{-x/3}$
for $x \geq 6$.

How long will it take an amount of money to
triple if interest is 10% compounded continu-
ously? You may assume $\ln 3 \approx 1.1$.

5 12 7 The answer cannot be determined without
knowing the initial amount invested. 11

Approximate the value of the definite integral of
the function f(x) from $x = 1$ to $x = 3$ using the
table below and the left endpoint method.

x	1	1.5	2	2.5	3
f(x)	1	2	2	3	5

8 5 6 9 4

Suppose that a museum sells tickets for an ex-
hibit and that the number of tickets sold (q) de-
pends upon the price of the ticket (p) so that
$q = -100p + 1000$. (Note that this means that
for each $1 decrease in price, 100 more people
will buy a ticket.) The museum wants to know
at what price they should sell their tickets so as
to maximize their revenue. What price would
this be, and how much revenue would the mu-

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seum make at this price? (16 points)

b. What is the equilibrium price p_e?

c. Compute the consumer surplus.

d. Compute the producer surplus.

Find the area between the curves $y = x^2 e^{2x}$ and $y = 0$ from $x = 0$ to $x = 1$. (Note that the first function always has a positive value, so it is

(16 points) Suppose that the demand curve for producing a quantity q of some item is given by:

$$D(q) = \frac{50}{q+1}$$

and the supply curve is given by:

$$S(q) = q + 6.$$

a. What is the equilibrium quantity q_e?

always greater than or equal to 0.) (12 points)