CENGAGE | WEBASSIGN

davidcorzo@ufm.edu (sign out)

Home My Assignments Grades Communication Calendar My eBooks

MC 006, section B, Fall 2019

7.8 Integrales Impropias (Homework)

INSTRUCTOR
Christiaan Ketelaar
Universidad Francisco Marroquin

Current Score

QUESTION	1	2	3	4	5	6	7	8
POINTS	3/3	3/3	3/3	3/3	3/3	3/3	3/3	3/3

TOTAL SCORE

24/24 100.0%

Due Date

DECEMBER 21
11:59 PM CST

Request Extension

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

Your last submission is used for your score.

---

1. 3/3 points Previous Answers SCalcET8 7.8.005. My Notes Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_{6}^{\infty} \frac{1}{(x-5)^{3/2}}\,dx$$

- (●) convergent
- ( ) divergent

✓

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

[ ] 2

[ ]

✓

2. 3/3 points Previous Answers SCalcET8 7.8.006. My Notes Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_0^{\infty} \frac{1}{\sqrt[8]{1 + x}}\, dx$$

- ○ convergent
- ◉ divergent

✓

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

DIVERGES

✓

3. 3/3 points Previous Answers SCalcET8 7.8.009. My Notes Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_2^{\infty} e^{-7p}\, dp$$

- (●) convergent
- ( ) divergent

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

$\frac{1}{7e^{14}}$

4. 3/3 points Previous Answers SCalcET8 7.8.014. My Notes Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_{1}^{\infty} \frac{e^{-1/x}}{x^2}\,dx$$

- (•) convergent
- ( ) divergent

✓

If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

$1-e-1$

✓

5. 3/3 points Previous Answers SCalcET8 7.8.023. My Notes Ask Your Teacher

Determine whether the integral is convergent or divergent.

$$\int_{-\infty}^{0} \frac{z}{z^4 + 4}\, dz$$

- (●) convergent
- ( ) divergent

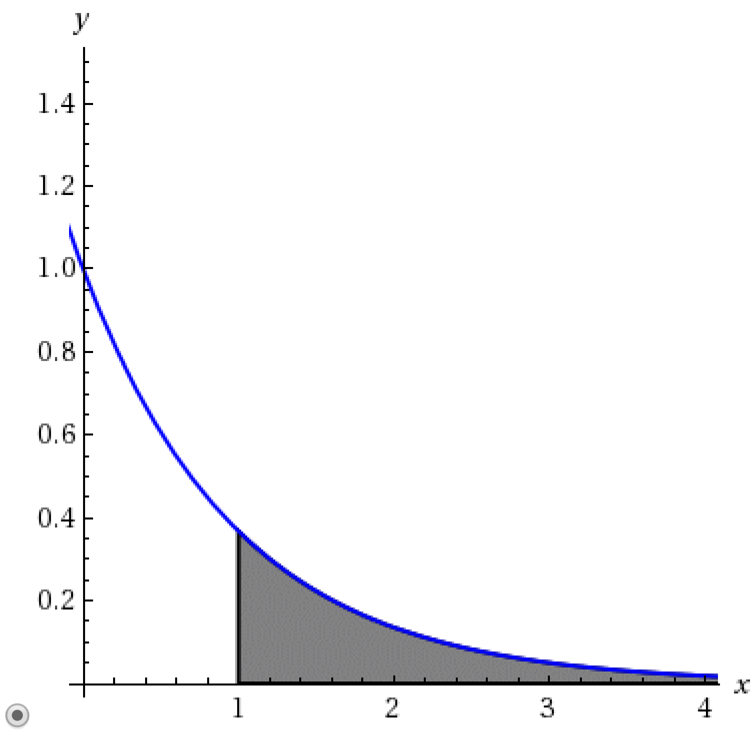
If it is convergent, evaluate it. (If the quantity diverges, enter DIVERGES.)

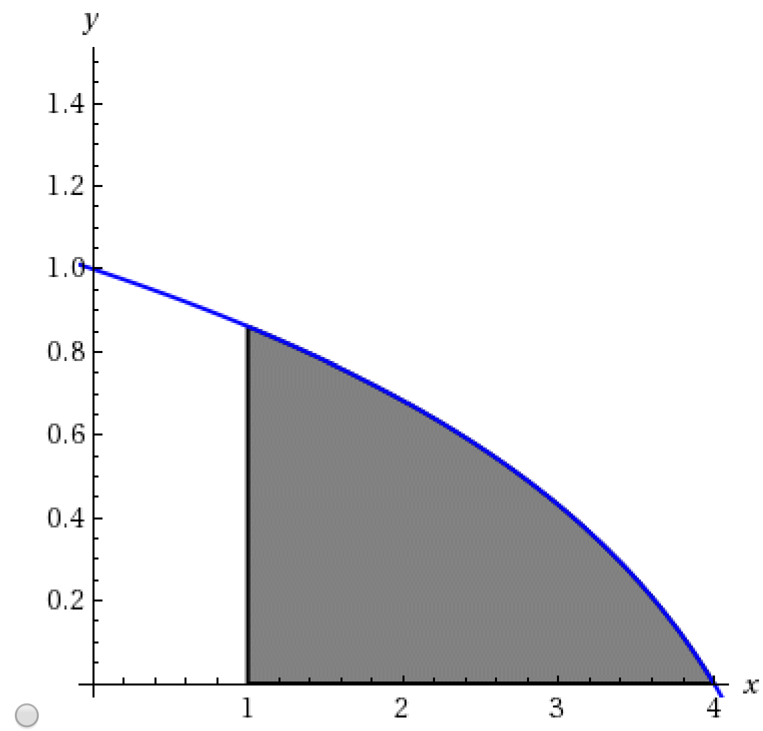
−π8

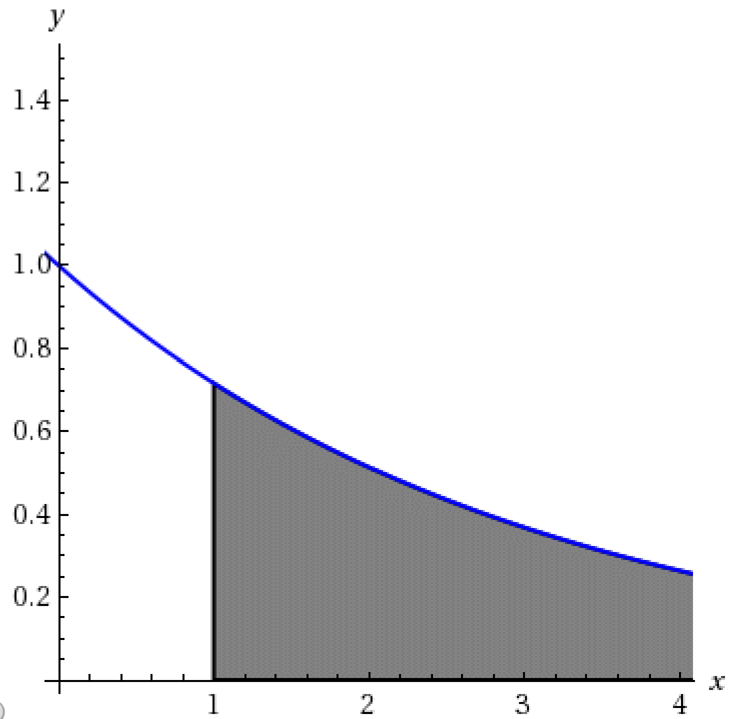
6. 3/3 points Previous Answers SCalcET8 7.8.041. My Notes Ask Your Teacher

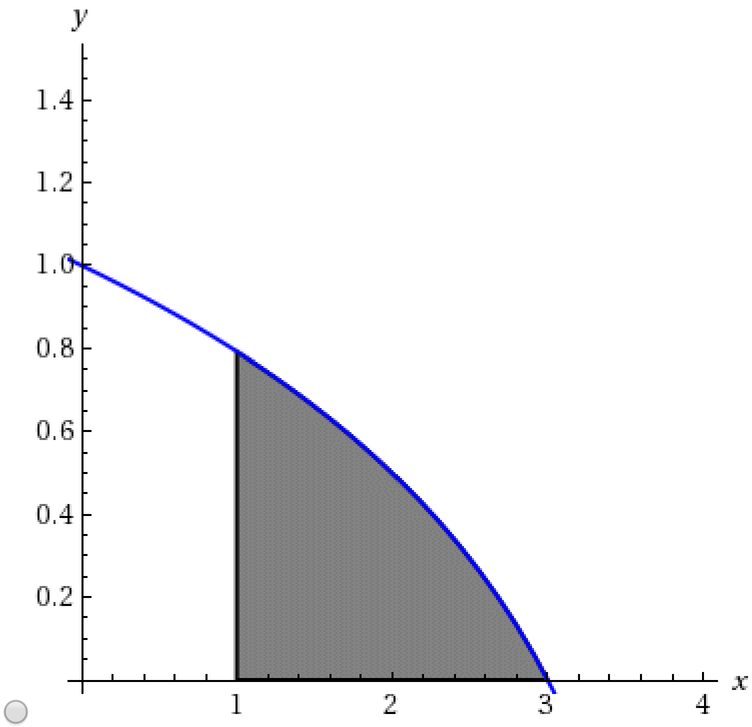
Sketch the region.

$$S = \left\{(x, y) \mid x \geq 1, 0 \leq y \leq e^{-x}\right\}$$









Find its area (if the area is finite). (If the area is not finite, enter ∞.)

$e-1$

7. 3/3 points Previous Answers SCalcET8 7.8.055. My Notes Ask Your Teacher

The integral

$$\int_0^{\infty} \frac{4}{\sqrt{x}(1+x)}\,dx$$

is improper for two reasons: The interval $[0, \infty)$ is infinite and the integrand has an infinite discontinuity at 0. Evaluate it by expressing it as a sum of improper integrals of Type 2 and Type 1 as follows.

$$\int_0^{\infty} \frac{4}{\sqrt{x}(1+x)}\,dx = \int_0^{1} \frac{4}{\sqrt{x}(1+x)}\,dx + \int_1^{\infty} \frac{4}{\sqrt{x}(1+x)}\,dx$$

4π

8. 3/3 points Previous Answers SCalcET8 7.8.501.XP.MI.SA. My Notes Ask Your Teacher

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Tutorial Exercise

Determine whether the integral is convergent or divergent. If it is convergent, evaluate it.

$$\int_1^\infty 23\,\frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$$

Step 1

$du =$
$$12\sqrt{x}$

$\int_1^\infty 23\,\frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx = \lim_{b\to\infty}\int_1^b 23\,\frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$ can be evaluated using the substitution $u = \sqrt{x}$ and $\boxed{\frac{1}{2\sqrt{x}}}$ dx.

Step 2

When $x = 1$ we have $u =$
$$1

$\boxed{1}$, and when $x = b$, we have $u =$
$$\sqrt{b}$

$\boxed{\sqrt{b}}$.

Step 3

$\sqrt{b}$ 23e ^{u}(

So $\lim_{b\to\infty} \int_1^b 23\frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx = \lim_{b\to\infty} \int_1$

$$2

$\boxed{2}$) du.

Step 4

$\lim_{b\to\infty} 2\int_1^{\sqrt{b}} 23e^{-u}\,du = \lim_{b\to\infty}$ 2[

$$−23e−u

$\boxed{-23e^{-u}}$ $\Big]_1^{\sqrt{b}}$

$= \lim_{b\to\infty}$ 2[

$$−23e−√b+23e−1

$\boxed{-23e^{-\sqrt{b}}+23e^{-1}}$]

Step 5

Finally, we have

$$\int_1^\infty \frac{23e^{-\sqrt{x}}}{\sqrt{x}}\,dx = \lim_{b\to\infty} 2\left[-23e^{-\sqrt{b}} + 23e^{-1}\right]$$

$$46e−1

$=$ $\boxed{46e^{-1}}$.

Thus the integral is convergent $\boxed{\text{convergent}}$ and equals

$$46e−1

$\boxed{\frac{46}{e}}$. (If the quantity diverges, enter DIVERGES.)

You have now completed the Master It.

Submit Assignment Save Assignment Progress

Home My Assignments Extension Request