Math 231 Test #1

Your Name:

Please circle your discussion group (1 pt)

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| --- | --- | --- |
| 1 Yang Yihong A410 | 4 Zhang Junwei A404 | 7 Liu Yuanzhe A424 |
| 2 Xu Yixiao A425 | 5 Liang Jun A408 | 8 Jaden Peterson Wen A421 |
| 3 Dai Ruiqi A426 | 6 She Yuxuan A423 |  |

* No notes, books or electronics during the exam.
* Do not open this test booklet until a proctor says start.
* For all free response questions, show work that justifies your answer.
* Raise your hand if you have a clarification question.
* Scratch paper is provided. You can ask for more if needed.
* Do not leave early: this disturbs others. If you finish your test early, check your work

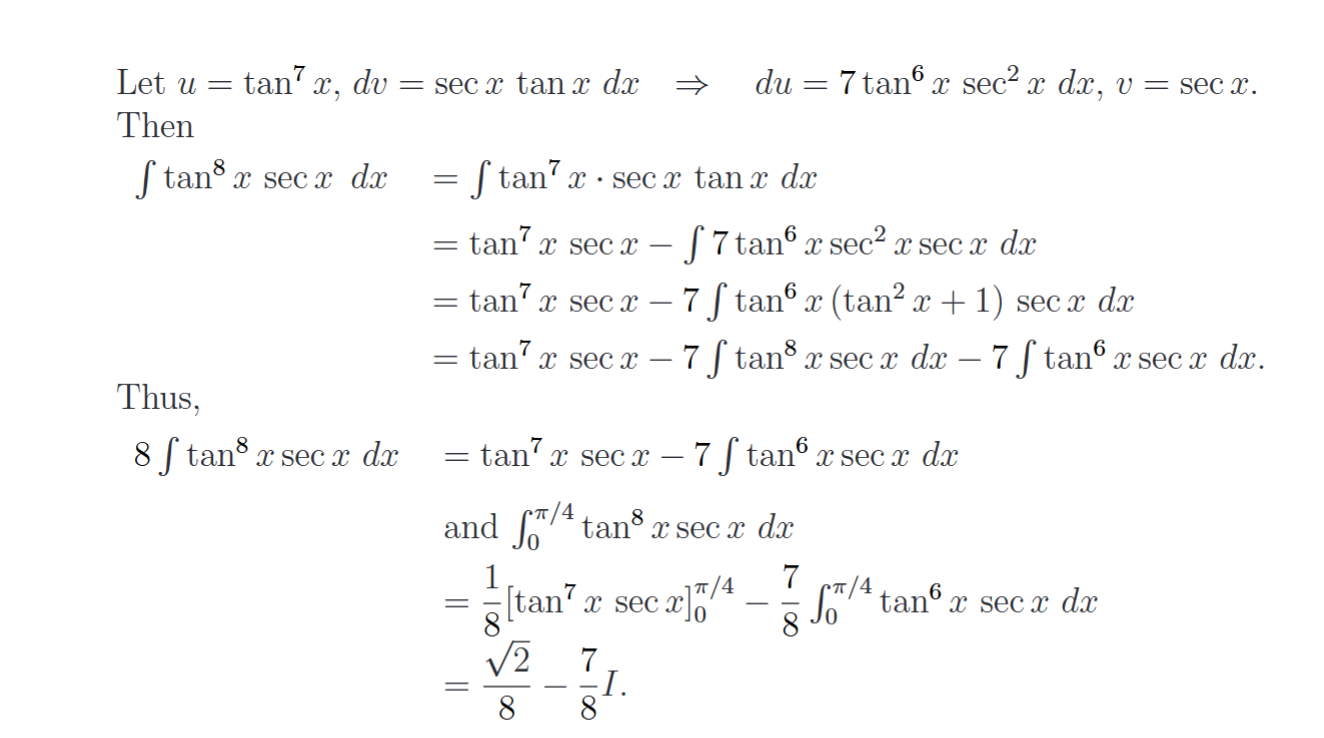
or just relax.

* Quit working when the test ends and hand your test booklet to proctors.

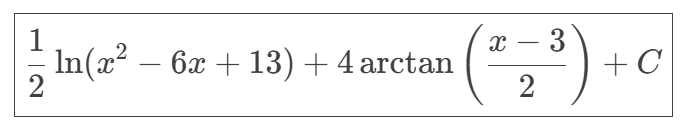
1. (15 points, 3 points each) Determine whether the statement is true or false. Circle the right answer.
2. Suppose and are continuous on and , if is convergent, then is convergent. (True or False)
3. Approximate integration is a numerical method to calculate the value of definite integral. (True or False)
4. is a linear differential equation. (True or False)
5. The areas of two regions are the same in the first quadrant of plane, if we rotate them about axis, the volumes we get must be the same. (True or False)
6. (True or False)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
| Points | 15 | 10 | 10 | 10 | 8 | 10 | 10 | 14 | 12 | 99 |
| Score |  |  |  |  |  |  |  |  |  |  |

1. (10 points) If , express the value of in terms of .

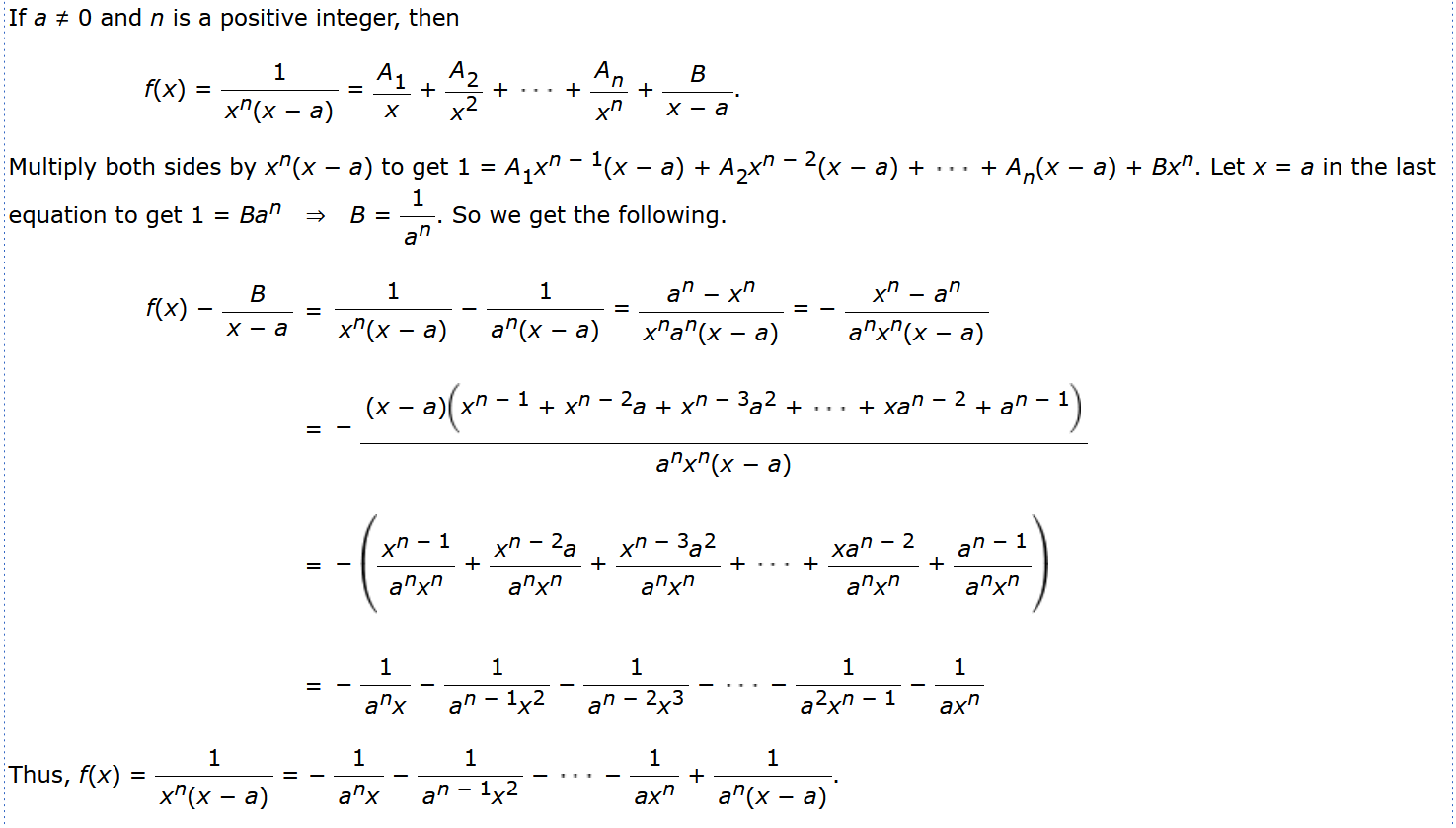


1. (10 points) Evaluate the following integral



1. (10 points) If and is a positive integer, find the partial fraction decomposition of .and calculate the coefficient.

Hint: first find the coefficient of . Then subtract the resulting term and simplify what is left.



1. (8 points) Determine whether the integral is convergent or divergent.

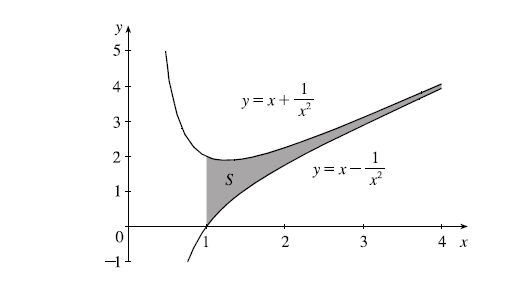
(a)

* Convergent
* Divergent

(b)

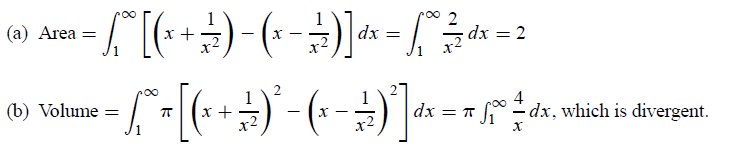
* Convergent
* Divergent

1. (10 points) Consider the region bounded by the curves and for

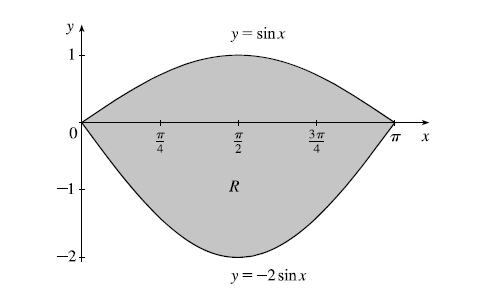


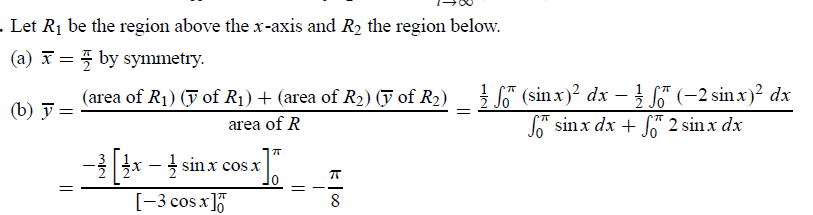
(a) Is the area of finite or infinite? If finite, find the area.

(b) Now suppose we retate around the axis. Is the volume of the resulting solid finite or infinite?

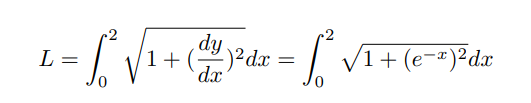


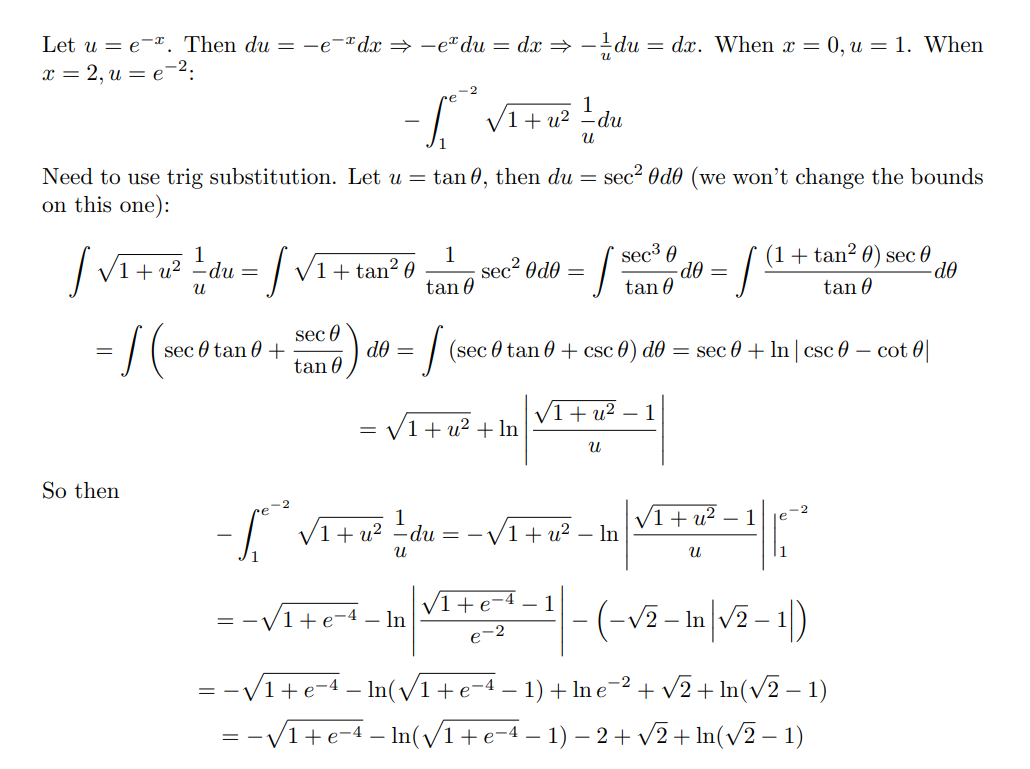
1. (10 points) Let be the region shaded below. Find the coordinates of the centroid of .





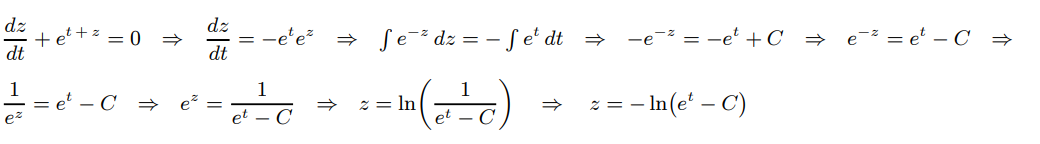
8. (14 points) , find the exact arc length for this function.





9. (12 points) Solve the differential equation.

(a)



(b)

