

Your Name

Your Signature

Student ID #

--	--	--	--	--	--	--

Quiz Section

--	--

Professor's Name

TA's Name

PLEASE READ the DIRECTIONS below:

- Do not open the test until instructed to do so. This test has 5 problems on 5 pages. Once the test starts, please check that you have a complete exam.
- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ page of handwritten notes. Do not share notes.
- Only a Ti-30x IIS calculator is allowed. Silence your cell phone and put it away.
- In order to receive credit, you **MUST SHOW YOUR WORK**. If we cannot tell how you are getting your answers, you may receive little or no credit, even if the answer happens to be correct.
- Simplify your answers as much as possible but leave them in exact form (e.g. $\pi\sqrt{2} + \frac{1}{2}$). Do not give decimal approximations, unless otherwise instructed.
- Place a box around **YOUR FINAL ANSWER** to each question.
- If you need more room, use the backs of the pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.
- Read each question carefully, before and after answering it. Do your best, and show your work.
- Take a deep breath. You've got this. Good luck!

Problem	Total Points	Score
1	12	
2	10	
3	8	
4	10	
5	10	
Total	50	

1. [12 points] Evaluate the following integrals. Show all steps. Simplify and box your answer.

(a) [4 points] $\int \frac{1+x^2}{x^3} dx$

(b) [4 points] $\int \frac{x^3}{1+x^2} dx$

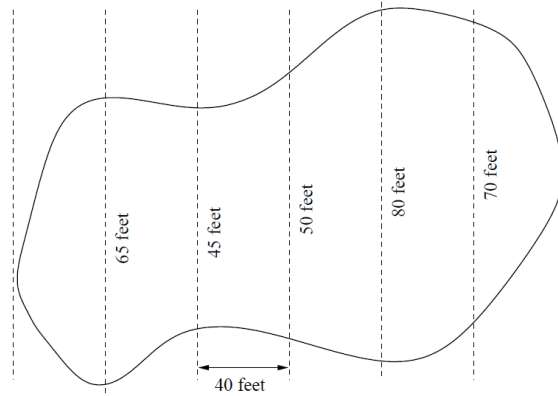
(c) [4 points] $\int_0^2 y^2 e^{-y^3} dy$

2. [10 points]

(a) [5 points] Let $F(x) = \int_1^{\sqrt{x}} \arctan(t) dt$. Evaluate $F(1)$ and $F'(1)$.

(b) [5 points] Compute $\lim_{n \rightarrow \infty} \sum_{i=1}^n \left(\frac{1}{\left(1 + \frac{9i}{n}\right)^2} \frac{9}{n} \right)$ by writing it as a definite integral and then solving the integral.

3. [8 points] The widths across a lake were measured at 40 ft intervals.

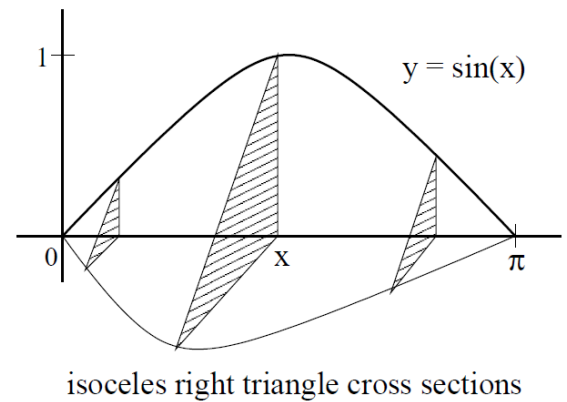


- (a) Use R_6 to estimate the area of the lake (right endpoints, with $n = 6$ subintervals)

- (b) Use the midpoint rule with the given data to give another estimate of the lake area.

4. [10 points] For each of the following, set up a definite integral that represents the volume described in the problem. DO NOT SIMPLIFY OR EVALUATE the integrals.
- (a) [6 points] Let R be the region enclosed between the graphs of $f(x) = 4x - x^2$ and $g(x) = x$. The region R is rotated about the vertical line $x = 5$ to form a solid of revolution.

- (b) [4 points] Let S be the solid shown below. Each cross section of S by a plane perpendicular to the x -axis for $0 \leq x \leq \pi$ is an isosceles right triangle, whose base equals its height (see the figure).



5. [10 points] Pete is driving his car along a straight and very busy street. He starts at his work place and needs to deliver a package to a customer. Being distracted, he starts going in the wrong direction, but realizes his mistake after a while. The velocity of his car at t hours during his trip is given by $v(t) = 120t^2 - 70t$, in miles per hour.
- (a) [4 points] Pete reaches his customer's office after one hour. How far away is the customer's office from Pete's work place?

- (b) [6 points] Pete's car gets 20 miles per gallon of fuel. How much fuel did Pete use up for this journey? Round your answer to two decimal digits.