

Your Name

Your Signature

Student ID #

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	Kirk	Venky
Section (Thurs.)	1:30	1:30 12:30
(circle one)	FA	FB FC

Problem	Total Points	Score
1	13	
2	12	
3	12	
4	7	
5	6	
Total	50	

- This exam is closed book. You may use one $8\frac{1}{2} \times 11$ sheet of notes.
- Do not share notes.
- Graphing calculators are not allowed.
- In order to receive credit, you must show your work. Do not do computations in your head. Instead, write them out on the exam paper.
- Place a box around **YOUR FINAL ANSWER** to each question.
- If you use a trial and error (or guess and check) method when an algebraic method is available, you will not receive full credit.
- If you need more room, use the backs of the pages and indicate to the reader that you have done so.
- Raise your hand if you have a question.

1 (13 points) Compute the following indefinite integrals.

(a) (6 points) $\int \frac{y^3 - 4y + 7}{y^2 + 2y - 3} dy$

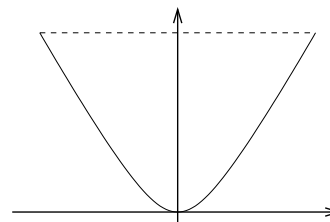
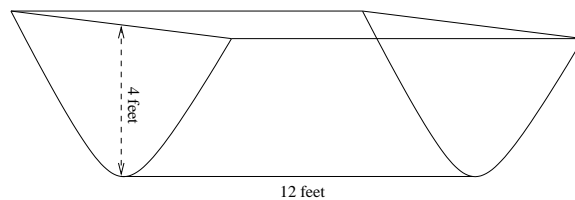
(b) (7 points) $\int \frac{x^3}{\sqrt{x^2 + 4}} dx$

2 (12 points) Compute the following definite integrals.

(a) (6 points) $\int_0^{3\pi^2} \cos \sqrt{x + \pi^2} dx$

(b) (6 points) $\int_0^{\pi/4} \sin^2(t) \cos^2(t) dt$

- 3 (12 points) A tank is full of pure ethyl alcohol. Its shape is a cylinder whose cross section is in the shape of the parabola $y = x^2$, as shown. The tank is 12 feet long and 4 feet deep. Find the work required to pump the alcohol out of the tank. Alcohol weighs 49.25 lb/ft^3 .



4 (7 points)
 $0 \leq x \leq \pi$

Compute the average value of the function $f(x) = x^2 \sin(x)$ on the interval

5 (6 points)
converges.

Is the improper integral $\int_1^{\infty} \frac{2}{t^2 + 4t + 4} dt$ convergent? Evaluate it if it