

Math 125 - Winter 2017

Exam 2

February 23, 2017

Name: _____

Section: _____

Student ID Number: _____

PAGE 1	12	
PAGE 2	12	
PAGE 3	12	
PAGE 4	12	
PAGE 5	12	
Total	60	

- There are 5 pages of questions. Make sure your exam contains all these questions.
- You are allowed to use a Ti-30x IIS Calculator model ONLY (**no other calculators allowed**). And you are allowed one **hand-written** 8.5 by 11 inch page of notes (front and back).
- Leave your answer in exact form. Simplify standard trig, inverse trig, natural logarithm, and root values. Here are several examples: you should write $\sqrt{4} = 2$ and $\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ and $\frac{7}{2} - \frac{3}{5} = \frac{29}{10}$ and $\ln(1) = 0$ and $\tan^{-1}(1) = \frac{\pi}{4}$. Also an answer containing an inverse trig inside of a trig function (such as $\cos(\sin^{-1}(x))$ or $\sin(2\cos^{-1}(x))$) is not acceptable, instead simplify using the methods from class.
- Show your work on all problems. The correct answer with no supporting work may result in no credit. **Put a box around your FINAL ANSWER for each problem and cross out any work that you don't want to be graded.**
- If you need more room, use backs of the pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.
- There may be multiple versions of the exam so if you copy off a neighbor and put down the answers from another version we will know you cheated. Any student found engaging in academic misconduct will receive a score of 0 on this exam. All suspicious behavior will be reported to the student misconduct board.
DO NOT CHEAT OR DO ANYTHING THAT LOOKS SUSPICIOUS!
WE WILL REPORT YOU AND YOU MAY BE EXPELLED!
Keep your eyes down and on your paper. If your TA sees your eyes wandering they will warn you only once before taking your exam from you.
- You have 80 minutes to complete the exam. Budget your time wisely.
SPEND NO MORE THAN 10 MINUTES PER PAGE!

GOOD LUCK!

1. (12 points) Compute:

(a) $\int \tan^3(5x) \sec^3(5x) dx$

(b) $\int \sin^{-1}(x) dx.$

2. (12 points) Compute:

(a) $\int_0^{\pi/2} \frac{\cos(x) \sin^2(x)}{\sin^2(x) + 1} dx$

(b) $\int \sqrt{27 + 6x - x^2} dx$

3. (12 points) Compute:

(a) $\int \frac{3x - 2}{(x - 1)(x + 2)^2} dx$

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

4. (12 points)

(a) Evaluate the improper integral or show that it diverges: $\int_{4/\pi}^{\infty} \frac{\cos(1/x)}{x^2} dx$

(b) Let R be the region bounded by $y = \sin(2x)$ and the x -axis and between $x = 0$ and $x = \pi/2$. Find the volume of the solid obtained by rotating this region about the y -axis. (Set up **and** evaluate)

5. (12 points) A trough-shaped tank is full of water and all the water is going to be pumped up and out of a spout. The dimensions are shown below in meters. Note the top of the spout is 2 m above the top of the full tank (this is identical to a problem from homework, so interpret the picture in the same way as homework).

Find the work required to pump the water out of the spout shown. (include units)

Use 9.8 m/s^2 for the acceleration due to gravity and 1000 kg/m^3 for the density of water.

