Math 125 **First Midterm** **Fall 2018**

Your Name (please PRINT clearly)

Student ID #

PLEASE READ DIRECTIONS BELOW:

- Do not open the test until instructed to do so.
- **The exam pages are double-sided.** Once the exam starts, check that you have a complete exam: there should be 7 questions on 3 double-sided pages.
- 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.
  Turn off your cell phone and put it away until the exam is over.
- 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, except when otherwise instructed.
- **Do not write too close to the edge of pages.**
  Place a box around $\boxed{\text{YOUR FINAL ANSWER}}$ to each question.
- Raise your hand if you have a question.
- Read each question carefully, before and after answering it. Do your best, and show your work. Good luck!

Problem	Points	Score
1	12	
2	6	
3	4	
4	8	
5	6	
6	6	
7	8	
Total	50	

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

   (a) $\displaystyle\int \frac{10x^2}{\sqrt{2-x^3}} + \frac{3}{\sqrt{1-x^2}}\,dx$

   (b) $\displaystyle\int_{-\pi/3}^{\pi} |\sin(x)|\,dx$

2. (6 points) A car travels along a straight road. The following table contains sample points of the velocity of the car, sampled every 10 minutes over the first hour of driving.

t (hrs.)	v(t) (mph)
0	20
1/6	40
2/6	-20
3/6	-40
4/6	-30
5/6	10
1	60

Use the **right endpoints** to estimate:

(a) the total distance driven in the first hour:

(b) the displacement of the car after the first hour:

3. (4 points) Which of the functions labeled $F(x)$ in (a)-(d) below satisfy both conditions:

$$F'(x) = e^{x^2} \textbf{ and } F(2) = 0?$$

For each, state Yes or No. If "No" indicate which of the conditions fail.

(a) $F(x) = \int_0^x e^{t^2}\,dt$

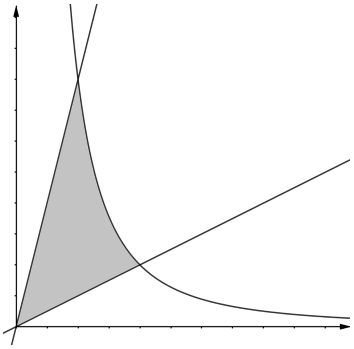
(b) $F(x) = \int_2^x e^{t^2}\,dt$

(c) $F(x) = \int_0^2 e^{t^2}\,dt$

(d) $F(x) = \int_4^{x^2} e^{t}\,dt$

4. (8 points) Find the area of the region bounded by the curves

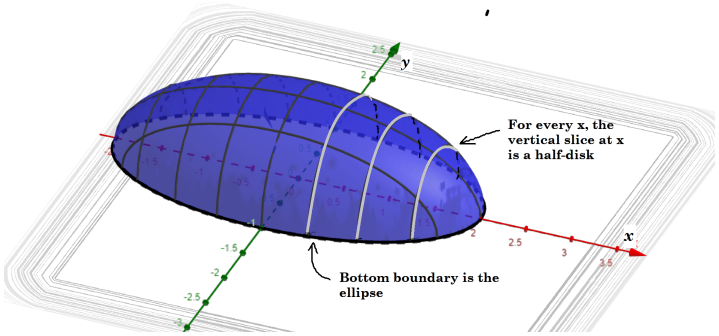
$$y = \frac{8}{x^2},\ y = 8x,\ \text{and } y = x.$$



5. (6 points) Compute the volume of the solid pictured below. Its bottom side is bounded in the xy-plane by the ellipse:

$$x^2/4 + y^2 = 1.$$

All vertical slices through this solid that are perpendicular to the x-axis at x-values in the interval $-2 < x < 2$ are half-disks.



6. (6 points) Sketch a picture of the region R entirely enclosed by the curve $x = 1 - y^2$ and the y-axis.

SET UP (but DO NOT COMPUTE) an integral equal to the volume of the solid of revolution obtained by rotating this region R around the **horizontal axis of rotation** $y = 1$**.**

7. (8 points) A car drives along a straight road, from a point A to a point B, which is 3000 ft away from point A.

   The car starts at rest at point A, accelerates uniformly to its maximum speed of 100 ft/sec in 20 seconds, then drives at maximum speed for a while, before finally braking at a constant deceleration of 20 ft/sec^2 and coming to a complete stop at point B.

   How long does it take the car to complete this trip, from A to B?