Math 126 G - Spring 2018
Midterm Exam Number Two
May 17, 2018

Name: ______________________ Student ID no. : ______________

Signature: ____

1	10	
2	9	
3	12	
4	14	
5	7	
6	8	
Total	60	

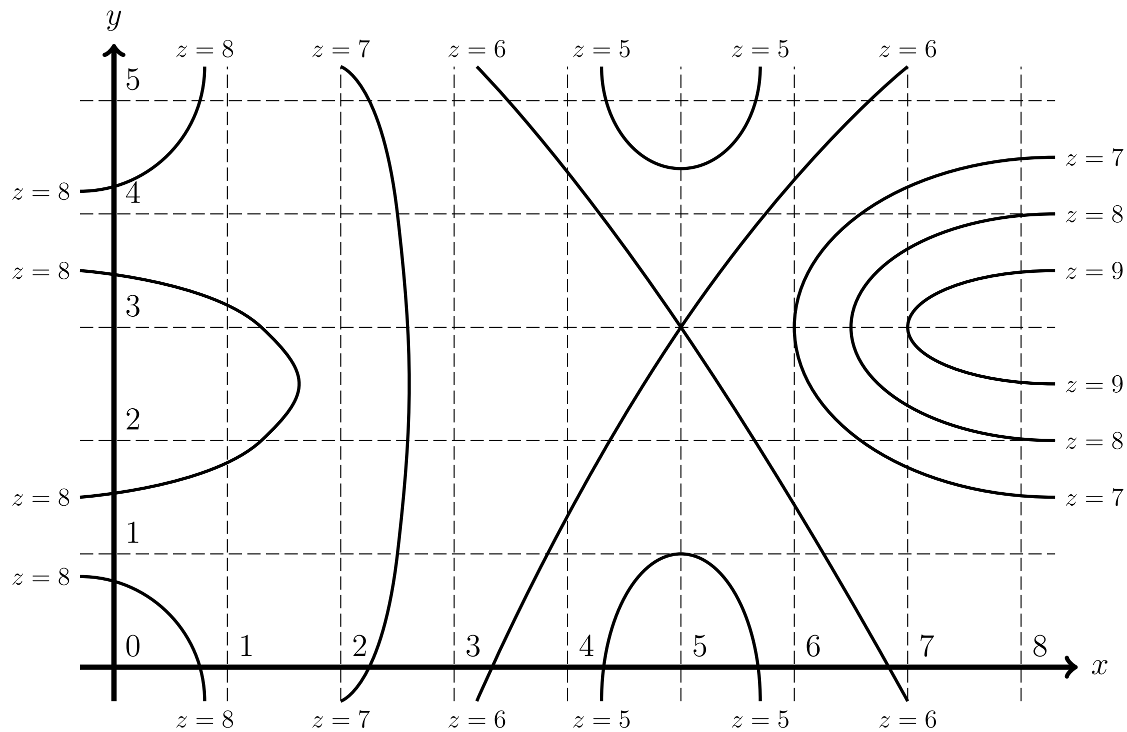
- This exam consists of **six** problems on **four** double-sided pages.
- Show all work for full credit.
- You may use a TI-30X IIS calculator during this exam. Other calculators and electronic devices are not permitted.
- You do not need to simplify your answers.
- If you use a trial-and-error or guess-and-check method when a more rigorous method is available, you will not receive full credit.
- $\boxed{\text{Draw a box}}$ around your final answer to each problem.
- **Do not write within 1 centimeter of the edge!** Your exam will be scanned for grading.
- If you run out of room, write on the back of the first or last page and indicate that you have done so. If you still need more room, raise your hand and ask for an extra page.
- You may use one hand-written double-sided 8.5″ by 11″ page of notes.
- You have 80 minutes to complete the exam.

1. Consider the function $f(x, y) = 2xy^2 - y^3 + x\sqrt{y} - 4$.

   (a) **[7 points]** Write the linearization $L(x, y)$ for f at the point $(3, 4)$.

   (b) **[3 points]** Approximate a value of y such that $f(3.01, y) = 33.95$.

2. **[3 points per part]** Here are the level curves of the surface $z = f(x, y)$.



(a) Name three points at which $f_y(x, y) = 0$.

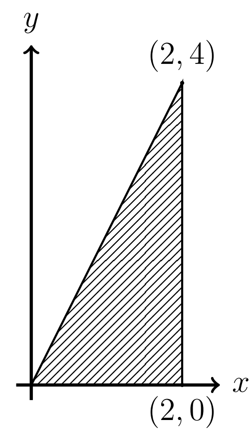
(b) Write the equation for the tangent plane to the surface $z = f(x, y)$ at the point $(5, 3, 6)$.

(c) Estimate the value of $\displaystyle\int_3^5 \int_2^4 f(x, y)\, dy\, dx$. (Circle one answer.)

Less than 0	Between 0 and 10	Between 10 and 20
Between 20 and 30	Between 30 and 40	Greater than 40

3. **[12 points]** Consider the function $f(x, y) = x^3 + xy - y^2$.

   Find the absolute maximum and minimum values of $f(x, y)$ on the triangle below:



4. **[7 points per part]** Evaluate each integral.

(a) $\displaystyle\int_0^1 \int_0^3 y\sqrt{1+xy}\,dy\,dx$

(b) $\displaystyle\int_0^3 \int_{2x}^6 e^{y^2}\,dy\,dx$

5. **[7 points]** Oh wow, another integral! Nice!

Evaluate $\displaystyle\int_0^{\sqrt{2}} \int_x^{\sqrt{4-x^2}} \sin(x^2+y^2)\,dy\,dx.$

6. **[8 points]** Let D be the region pictured below, bounded by the two circles $x^2+y^2=4$, $(x-1)^2+y^2=1$, and the x-axis.

A lamina in the shape of D has density function $\rho(x,y)=y$.

Compute the mass of the lamina.