Math 126 A - Spring 2019
Midterm Exam Number One
April 25, 2019

Name: ______________________________ Student ID no. : ________________

Signature: ____

1	10	
2	10	
3	10	
4	10	
5	10	
Total	50	

- This exam consists of **five** 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.
- 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 50 minutes to complete the exam.

1. **[10 points]** Find the line of intersection between the two planes $x + y + z = 3$ and $x + 2y + 2z = 5$.

2. **[10 points total]** Consider the points $A(0, 0, 0)$ and $B(0, 0, 1)$.

   (a) **[5 points]** Write an equation that describes the sphere S consisting of points P whose distance to B is twice the distance to A.

   (b) **[[2 points]** What is the center of the sphere S?

   (c) **[2 points]** Is the point $(0, 0, 1/3)$ on the the sphere S?

   (d) **[1 points]** What is the radius of the sphere S?

3. **[10 points]** Find the curvature $\kappa(t)$ of the curve

$$\overrightarrow{\mathbf{r}}(t) = \langle 1, \sin t, \cos t \rangle$$

4. **[5 points each part]**

(a) Find a vector function that describes the intersection of the surfaces $x = 2\sin z$ and $x^2 + y^2 = 4$.

(b) Compute the curvature of this curve. Hint: it does not matter which point on the curve you pick!

5. **[10 points]** Find the plane containing the line $L = \langle 3 + t, 5 - t, 7 + 2t \rangle$ and the point $A(0, 0, 0)$.