Math 126 A - Winter 2019
Midterm Exam Number One
February 7, 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.

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1. **[5 points per part]** Consider the points $A(2,0,0)$, $B(0,1,0)$ and $C(0,0,3)$.

   (a) Find an equation for the plane passing through the points A, B, C.

   (b) Find the area of the triangle ABC.

2. **[5 points per part]** Consider the plane H with equation $3x + 6y + 2z = 6$ and the point $P(0, 0, 0)$.

   (a) Find the equation of the line passing through P and perpendicular to the plane H.

   (b) Find the distance from P to H.

3. **[10 points total]** Consider the point $Q(0, 0, 0)$ and the plane S with equation $z = 2$.

   (a) **[8 points]** Find the equation for the set of points equidistant from Q and S.

   (b) **[2 points]** What kind of surface is this?

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

(a) Find a vector function that describes the intersection of the surfaces $x = \cos z$ and $x^2 + y^2 = 1$.

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

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

(a) Find the point of intersection between the vector functions $\overrightarrow{\mathbf{r}}(t) = \langle \cos t, \sin t, t \rangle$ and the line L with vector equation $\langle s, 1 - s, \pi/2 \rangle$.

(b) Find the angle between the curve $\overrightarrow{\mathbf{r}}(t)$ and the line L at the point of intersection from part (a).