Math 126, Section D - Spring 2014
Midterm I
April 24, 2014

Name: _____

Student ID Number: _____

Section: DA 11:30-12:20 by Hailun ☐ DB 12:30-1:20 by Hailun ☐

DC 11:30-12:20 by Bo Peter ☐ DD 12:30-1:20 by Bo Peter ☐

exercise	**possible**	**score**
1	11	
2	11	
3	10	
4	10	
5	8	
total	50	

- Check that this booklet has all the exercises indicated above.
- TURN OFF YOUR CELL PHONE.
- Write your name and your student ID.
- This is a 50 minute test.
- You may use a scientific calculator and one 8.5×11 inch sheet of (two-sided) handwritten notes. All other electronic devices (including graphing calculators) are forbidden.
- Unless otherwise indicated, your answers should be exact instead of decimal approximations. For example $\frac{\pi}{4}$ is an exact answer and is preferable to its decimal approximation 0.78.
- Unless otherwise indicated, show your work and justify all your answers. Box your $\boxed{\text{final answer}}$.

Exercise 1 (7+4=11 points).

Consider the points $A = (2, 7, 1)$, $B = (5, 3, 1)$ and $C = (1, 0, 2)$.

(a) What is the area of the triangle that is formed by *ABC*?

(b) For the same triangle, what is the angle at corner *A*, rounded to the nearest degree?

Exercise 2 (6 + 5 = 11 points).

a) Find an equation of the form $Ax + By + Cz = D$ that describes the plane that contains the points $P = (5,2,1), Q = (4,2,5)$ and $R = (8,3,1)$.

b) The plane from above intersects the *xz*-plane in a line. Give the parametric equations of that line.

Exercise 3 (10 points).

For the curve $\vec{r}(t) = (3\sin(2t), \cos(4t))$, find the tangent line at $t = \frac{\pi}{8}$ and give its parametric equations. What is the slope of this tangent line?

Exercise 4 (10 points).

Compute the curvature $\kappa(t)$ for the curve $\vec{r}(t) = (t, t, t^2)$.

Exercise 5 (8 points).

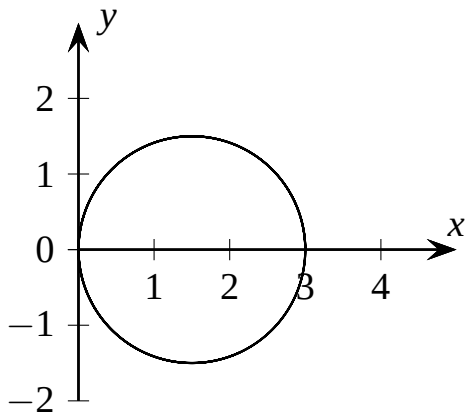
Match each polar equation to the correct curve (no justification needed).

1) $r = 1 + 3\cos(\theta)$ belongs to curve ☐

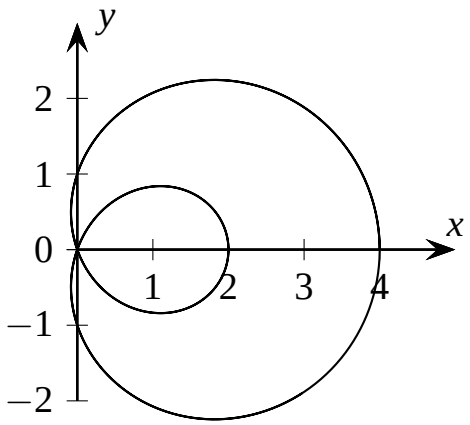
2) $r = 3\cos(2\theta)$ belongs to curve ☐

3) $r = 3\cos(\theta)$ belongs to curve ☐

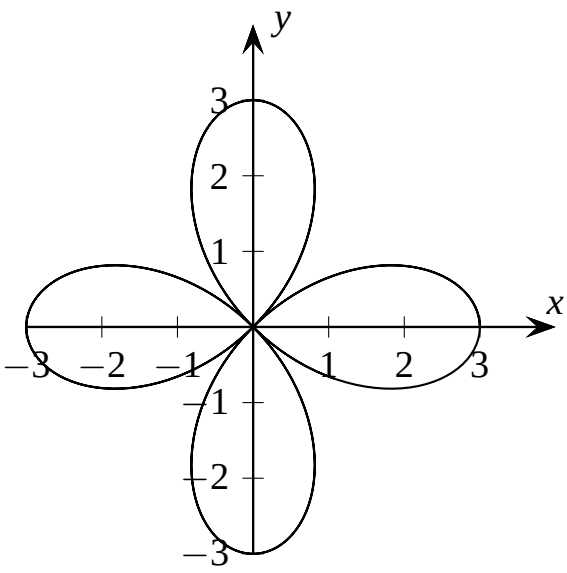
4) $r = 3\sin(\theta)$ belongs to curve ☐



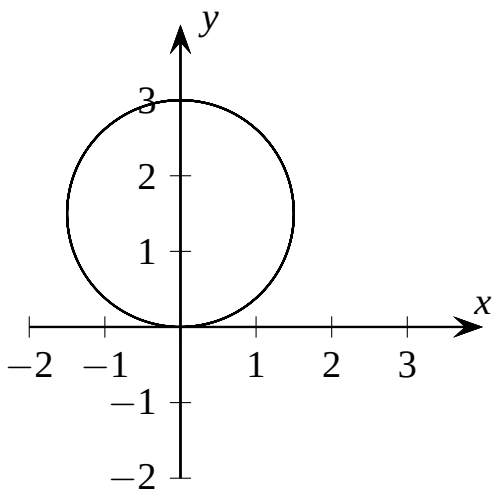
curve **A**



curve **B**



curve **C**



curve **D**