

## MATH 1572H SAMPLE PROBLEMS

May 2 , 2018

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The final exam will cover the Sections 10.1 - 10.9, 11.1 - 11.3, 12.1 - 12.4, 13.1 - 13.8, 14.1 - 14.4, 14.6, 15.1 - 15.4, 16.1 - 16.5, 17.1 - 17.3, 18.1 - 18.4 In addition to the problems given below, please also study the previous exam/sample questions for the final exam.

1. Let  $a$  and  $b$  are vectors. Show that  $|a \times b|^2 = |a|^2|b|^2 - (a \cdot b)^2$ .
2. Find the area of the parallelogram with vertices  $A(1, 2, 3)$ ,  $B(1, 3, 6)$ ,  $C(3, 8, 6)$ , and  $D(3, 7, 3)$ .
3. Find the area enclosed by one loop of the four-leaved rose  $r = \cos(2\theta)$ .
4. Find the length of the polar curve  $r = \theta$ ,  $0 \leq \theta \leq 2\pi$ .
5. Identify and sketch the polar curves
  - (a)  $r = a\sin(\theta) + b\cos(\theta)$ , where  $a$  and  $b$  are constants with  $ab \neq 0$ .
  - (b)  $r = 3 + \sin(\theta)$
6. A conic section is given by the polar equation  $r = 10/(3 - 2\cos(\theta))$ . Find the eccentricity, identify the conic, locate the directrix, and sketch the conic.