Additional Review Problems for Math 152, Spring 2017

The review materials for Exam 1 and the review materials for Exam 2 can be used to review for the final exam in Math 152. These materials did not include any problems dealing with complex numbers, and did not include any problems from sections 11.3, 11.4. For this reason, we are giving you the following review problems about complex numbers and 11.3, 11.4:

(1) Find the length of the cardioid $r = 1 - \cos\theta$, $0 \leq \theta \leq 2\pi$.

(2) Find the area inside the cardioid $r = 1 + \sin\theta$, $0 \leq \theta \leq 2\pi$.

(3) Find the center and radius of each of the two circles $r = \sin\theta$, $r = \cos\theta$.

(4) Prove that $2r = \sec(\theta + \pi/4)$ is a polar equation of a line in the xy-plane.

(5) Find the complex conjugate and the modulus of $(2 - 3i) \cdot (5 - 4i)$.

(6) Explain how the formula $e^{i\theta} = \cos\theta + i\sin\theta$ can be obtained from the series expansions for the exponential function and the functions sin and cos.

(7) Using de Moivre's formula, find a way to express $\sin(5x)$ in terms of $\sin x$ and $\cos x$.

(8) Find all solutions of the equation $z^3 = -i$, where z is a complex number.