Mini-exam 6 (10 points total) Math 141, Summer 2015

Name:

Problem 1 Find the slope of the tangent line to the curve $r = \tan\theta \sec\theta$ at $\theta = \dfrac{\pi}{3}$.

(a) The tangent line is vertical.

(b) $\sqrt{3}$

(c) 0

(d) $-2\sqrt{3}$

(e) $2\sqrt{3}$

Problem 2 Find the slope of the tangent line to the curve $x = t - \sin t$, $y = 2(1 - \cos t)$ at $t = \dfrac{\pi}{3}$.

(a) The tangent line is vertical.

(b) $\sqrt{3}$

(c) $\dfrac{2}{\sqrt{3}}$

(d) $-2\sqrt{3}$

(e) $2\sqrt{3}$

Problem 3 Find the Cartesian equation of the curve with parametric equations $r = \tan\theta \sec\theta$.

(a) $y = x^2$

(b) $x = y^2$

(c) $x^2 + y^2 = x$

(d) $x^2 + y^2 = y$

(e) $\sqrt{x^2 + y^2} = x$

Problem 4

(a) Sketch the curves $r = 3\cos\theta$ and $r = 1 + \cos\theta$, and label all points of intersection. Work must be shown to gain the full credit.

(b) Find the area of the region that lies inside the first curve and outside the second curve.