MATH 214 (R1) Winter 2008
Intermediate Calculus I

Problem Set #6

Completion Date: Friday February 29, 2008

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Question 1. [**Sec. 11.3, # 20**] Identify the curve

$$r = \tan\theta \, \sec\theta$$

by finding a Cartesian equation for the curve.

Question 2. [**Sec. 11.3, # 26**] Find the polar equation for the curve represented by the Cartesian equation

$$x^2 - y^2 = 1.$$

Question 3. [**Sec. 11.3, # 34**] Sketch the curve with polar equation

$$r = 1 - 3\cos\theta.$$

Question 4. [**Sec. 11.3, # 38**] Sketch the curve with polar equation

$$r = 2\cos 3\theta.$$

Question 5. [**Sec. 11.3, # 44**] Sketch the curve with polar equation

$$r^2\theta = 1.$$

Question 6. [**Sec. 11.3, # 60**] Find the slope of the tangent line to the polar curve

$$r = \sin 3\theta$$

at the point $\theta = \dfrac{\pi}{6}$.

Question 7. [**Sec. 11.4, # 18**] Find the area of the region enclosed by one loop of the curve

$$r = 4\sin 3\theta.$$

Question 8. [**Sec. 11.4, # 24**] Find the area of the region that lies inside the curve $r = 1 - \sin\theta$ and outside the curve $r = 1$.

Question 9. [**Sec. 11.4, # 30**] Find the area of the region that lies inside both of the curves $r = \sin 2\theta$ and $r = \sin\theta$.

Question 10. [**Sec. 11.4, # 32**] Find the area of the region that lies inside both of the curves $r^2 = 2\sin 2\theta$ and $r = 1$.

Question 11. [**Sec. 11.4, # 40**] Find all points of intersection of the curves $r = \cos 3\theta$ and $r = \sin 3\theta$.

Question 12. [**Sec. 11.4, # 46**] Find the exact length of the of the polar curve

$$r = e^{2\theta}, \quad 0 \le \theta \le 2\pi.$$