ESP Math 182 **Spring 2015**

Worksheet 28

23 April 2015

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1. **Warm up:** Convert the coordinates on the left to polar (r, θ) and the ones on the right to rectangular (x, y).

   (a) $(0, 0)$
   (b) $(1, 0)$
   (c) $(0, 1)$
   (d) $(1, 1)$
   (e) $(55, 78.2)$
   (f) $(0, 0)$
   (g) $(1, 0)$
   (h) $(0, \pi)$
   (i) $(1, \pi)$
   (j) $(41/7, 22\pi/3)$

2. Consider the parametric curve $(x, y) = (\pi \sin(t + \pi), \sin(t))$.

   (a) What is the length of the curve from $t = 0$ to $t = \pi/2$?

   (b) Give the curve in rectangular coordinate form $y = f(x)$.

   (c) Give the curve $y = 5x$ as a parametric curve with $x = \sin(t)$.

3. Recall the Maclaurin series is the Taylor series centered at $a = 0$.

   (a) Give the first three terms of the Maclaurin series of $f(x) = 3e^{3x^2+2}$.

   (b) Give the first three terms of Maclaurin series of $g(x) = \sin(2x - \pi) + 2$.

   (c) Give the second degree Maclaurin polynomial of $f(x)g(x)$.

   (d) In the Maclaurin polynomial of $f(x)g(x)$, how many terms are added to get the coefficient of:

      i. x^{20}

      ii. x^{21}