Math 252 (Bueler): Quiz 11 **25 April 2024**

Name: _____ _____ / **25**

30 minutes. No aids (book, notes, calculator, internet, etc.) are permitted. Show all work and use proper notation for full credit. Put answers in reasonably-simplified form. 25 points possible.

1. [5 points] Use binomial series to write the Maclaurin series of $f(x) = \sqrt[3]{1+x}$. In particular, write the third Taylor polynomial $p_3(x)$ with simplified coefficients.

2. [4 points] Eliminate t from the parametric curve $x(t) = 5\cos t$ and $y(t) = 2\sin t$, to write it as a cartesian (rectangular) equation.

3. [4 points] Sketch the parametric curve by eliminating the parameter. (*Hint. Here t can be any real number. However, pay attention to* which (x,y) *points are generated by the parametric formula.*)

$$x = e^t, \quad y = e^{2t}$$

4. [4 points] Convert the parametric curve into rectangular form by eliminating the parameter. No sketch is required.

$$x = 4t + 3, \quad y = 16t^2 - 9$$

5. [4 points] Find the **slope** and the **equation** of the tangent line at $t = -1$:

$$x = 2t, \quad y = t^3$$

6. [4 points] For the curve $x = 4\cos\theta$ and $y = 4\sin\theta$, find the concavity at $\theta = \pi/4$.

Extra Credit. [1 point] The parametric curve $x = (\arctan t)\cos t$, $y = (\arctan t)\sin t$ has a *circle* as its asymptote as $t \to \infty$. Find the cartesian equation of this circle.

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