Math 76 Assessment 20 §7.1-7.2 Parametric Equations

Things to remember:

1. The problem to complete is shown below. Write your name and solution on the next page where instructed.

2. Please make sure your full name is written neatly in the box.

3. Your score will be determined by **Mechanics** (2 points) and by **Content** (3 points).

4. The following rubric will be used for **Mechanics**:

Clear neat work, steps in order and easily followed, proper use of notation	2
Mostly clear work; minor errors in notation or skipped steps	1.5
Steps/handwriting hard to follow/read; major errors in notation	1
No discernible or relevant work, or work impossible to read/follow	0

5. You are not allowed to consult outside sources, including notes, books, the internet, or other people, while taking this assessment. Calculators are allowed only for basic numerical or scientific computations, not for graphing or algebra.

6. If you need more room, you may finish on a plain piece of paper or blank document. If you do all your work on separate sheets, please **copy the problem** and make sure to write **Version D** at the top of the first page.

7. When you are finished, create a legible, well-lit **.pdf file** of your work and upload it to Assessment 20 on Gradescope. Please follow the directions to **assign the page(s)** of your submission that contain your work for the question. More info about submitting to Gradescope:

`http://bit.ly/gradescope-help`

Find the slope of the tangent line to the curve on the next page.

Your solution should include:

- (1 point) Explanation of your strategy, including a statement of any formulas used;
- (1 point) Correct computations leading to the answer;
- (1 point) Correct answer (0 if no explanation).

Assessment 20 Full Name: Tyler Gillette

Version D

Follow the directions on the previous page. Assume k is an unknown number not equal to 0. Find the slope of the tangent line to the graph represented by the parametric equations

$$x = k\sin(4t)$$
$$y = \cos(6t)$$

at the point where $t = \frac{\pi}{12}$. Your answer should be expressed as a simplified fraction in terms of k.

$x = k\sin(4T)$ $\quad y = \cos(6T)$ $\quad T = \frac{\pi}{12}$

$x' = 4k\cos(4T)$ $\quad y' = -6\sin(6T)$

$m = \frac{\text{rise}}{\text{run}} = \frac{y'}{x'} = \frac{-6\sin(6T)}{4k\cos(4T)}$

$x = k\sin\left(4\left(\frac{\pi}{12}\right)\right) = k\sin\left(\frac{\pi}{3}\right) = k\frac{\sqrt{3}}{2}$

$y = \cos\left(6\left(\frac{\pi}{12}\right)\right) = \cos\left(\frac{\pi}{2}\right) = 0$

$y - (0) = \left(\frac{-6\sin(6T)}{4k\cos(4T)}\right)\left(x - \left(k\frac{\sqrt{3}}{2}\right)\right)$

$y = \frac{-6\sin(6T)}{4k\cos(4T)}x - \frac{-6\sin(6T)}{4k\cos(4T)} \cdot \frac{\sqrt{3}}{2} \cdot k$

$-\frac{6\sqrt{3}\sin(6T)}{8k\cos(4T)} \cdot k$

$+\frac{3\sqrt{3}\sin(6T)}{4\cos(4T)}$

$$y = \frac{3\sin(6T)}{2k\cos(4T)}x + \frac{3\sqrt{3}\sin(6T)}{4\cos(4T)}$$ ✓