

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Write a system of parametric equations for the circle with center $(3, 7)$ and radius 2 that is traversed once in the counterclockwise direction starting from the point $(5, 7)$.

2. Consider the curve given by the system of parametric equations

$$\begin{cases} x(t) = \frac{1}{t} + 3t \\ y(t) = \sin(\pi t) \end{cases}, t > 0.$$

Find an equation for the tangent line to the curve at $t = 1$.

3. Consider the curve determined by the parametric equations

$$\begin{cases} x(t) = t \\ y(t) = 2t^{3/2} \end{cases}, 0 \leq t \leq 1.$$

Find the length of this curve between the initial and the terminal point.

