Sample Problem Sheet

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1. Find the gradient of the unit circle \((x^2 + y^2 = 1)\).
   
   **Solution:** Differentiating with respect to \(x\) gives:
   
   \[
   2x + 2y \frac{dy}{dx} = 0
   \]
   
   \[
   \frac{dy}{dx} = -\frac{2x}{2y} = -\frac{x}{\sqrt{1-x^2}}.
   \]

2. Differentiate the following functions:
   
   (a) \(f(x) = 4x^2 - 3x + 10\)
   
   **Solution:** \(f'(x) = 8x - 3\)

   (b) \(f'(x) = -4 \cos(-4x)\)