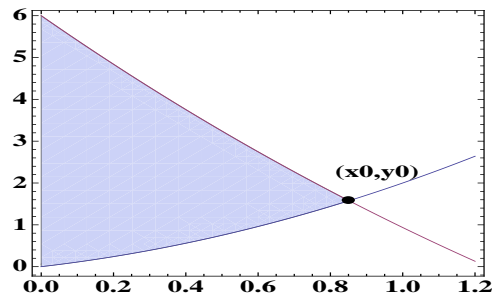**9.** [15 points] The graph shows the area between the graphs of $f(x) = 6\cos(\sqrt{2x})$ and $g(x) = x^2 + x$. Let (x_0, y_0) be the intersection point between the graphs of $f(x)$ and $g(x)$.

a. [6 points] Compute $P(x)$, the function containing the first three nonzero terms of the Taylor series about $x = 0$ of $f(x) = 6\cos(\sqrt{2x})$.

b. [3 points] Use $P(x)$ to approximate the value of x_0.

c. [3 points] Use $P(x)$ and the value of x_0 you computed in the previous question to write an integral that approximates the value of the shaded area. Find the value of this integral.

d. [1 point] Graph $f(x)$ and $g(x)$ in your calculator. Use the graphs to find an approximate value for x_0.

e. [2 points] Write a definite integral in terms of $f(x)$ and $g(x)$ that represents the value of the shaded area. Find its value using your calculator.