

Calculator Inactive:

Question 6

Let f be the function given by $f(x) = \sin\left(5x + \frac{\pi}{4}\right)$, and let $P(x)$ be the third-degree Taylor polynomial for f about $x = 0$.

- (a) Find $P(x)$.
- (b) Find the coefficient of x^{22} in the Taylor series for f about $x = 0$.
- (c) Use the Lagrange error bound to show that $\left|f\left(\frac{1}{10}\right) - P\left(\frac{1}{10}\right)\right| < \frac{1}{100}$.
- (d) Let G be the function given by $G(x) = \int_0^x f(t) dt$. Write the third-degree Taylor polynomial for G about $x = 0$.