

The goal is to find an approximation for π using Taylor polynomials.

Let $f(x) = \arctan(x)$ and let $x_0 = 0$.

1. Find $P_3(x)$, $P_5(x)$ and $P_7(x)$.
Feel free to use Maple to calculate the derivatives of f .
2. Use these to approximate $\arctan(1)$.
Use Theorem 2 to determine how close your approximations are.
3. What is the exact value of $\arctan(1)$?
4. Use your answers to #2 and #3 to find approximations for π .
5. Find a general form for $P_n(x)$.
6. Use $P_{15}(1)$ to approximate π . How accurate is your approximation?