Let $f(x) = \sin(x)$ and let $P_k(x)$ be the kth order Taylor polynomial for $f(x)$ at $x_0 = 0$.

1. Find $P_1(x)$, $P_2(x)$, $P_3(x)$, $P_4(x)$ and $P_5(x)$.

2. Verify your answer by graphing the polynomials and $f(x)$ on the same set of axes.

3. Use $P_5(x)$ to find an approximation for $\sin(3)$. Will this be larger or smaller than the actual value of $\sin(3)$?

4. Now find $P_{20}(x)$.
   Hint: You don't actually need to take all of the derivatives.