

Let $f(x) = e^x$.

Let $P_n(x)$ be the n th order Taylor polynomial for $f(x)$ at $x_0 = 0$.

1. For $n = 0, 1, 2, 3, 4$

(a) Find $P_n(x)$

(b) Check how well $P_n(x)$ approximates $f(x)$ by graphing $P_n(x)$ and $f(x)$ on the same set of axes.

2. Use $P_3(x)$ to find an approximation for $e^{1/2}$. Will this be larger or smaller than the actual value of $e^{1/2}$?

Let $f(x) = \sin(x)$ and let $P_5(x)$ be the 5th order Taylor polynomial for $f(x)$ at $x_0 = \pi$.

1. Find $P_5(x)$
2. Verify your answer by graphing $P_5(x)$ and $f(x)$ on the same set of axes.
3. Use $P_5(x)$ to find an approximation for $\sin(6)$. Will this be larger or smaller than the actual value of $\sin(6)$?