1 Find the Taylor polynomial of degree 5 at \( a = 0 \) of \( x^2 e^{-x} \).

2 Find the Taylor polynomial of degree 10 at \( a = 0 \) of \( e^{-x^2} \).

3 Let \( T_n(x) \) be the Taylor polynomial of degree \( n \) at \( a = 0 \) for the function \( \sin(x) \).
Plot \( \sin(x), T_1(x), T_2(x), T_3(x), T_6(x) \) for \(-2\pi \leq x \leq 2\pi\).

4 Find the Taylor polynomial of degree 12 at \( a = 0 \) of \( \cos(x^{3/2}) \).

5 Find the Taylor polynomial of degree 7 at \( a = 0 \) of \( \frac{\sin(x)}{x} \).

6 Find the Taylor polynomial of degree 7 at \( a = 0 \) of \( \frac{\sinh(x)}{x} \).

7 Find the Taylor polynomial of degree 4 at \( a = \pi/2 \) of \( \sin(x) \).

8 Find the Taylor polynomial of degree 2 at \( a = 3 \) of \( x^2 + 2x + 5 \).