Examples:

1. Compute the 5th degree Taylor polynomial for \( f(x) = \frac{1}{1-x} \) at \( a = 0 \).

2. Do the same for \( f(x) = \frac{1}{1-x^2} \).

3. Do the same for \( f(x) = \frac{1}{(1-x)^2} \).

4. Do the same for \( f(x) = \frac{x^2}{1-x} \).

Exercises: For each of the following functions, find the corresponding Taylor polynomial of degree 4 at the specified point \( a \).

1. \( f(x) = \frac{1}{x}, a = 2 \).

2. \( f(x) = \frac{1}{x^2}, a = 2 \) (careful with this one!).

3. \( f(x) = \tan x, a = 0 \).

4. \( f(x) = \tan(x^2), a = 0 \).

5. \( f(x) = e^x, a = 0 \).

6. \( f(x) = e^{2x^2}, a = 0 \).

7. \( f(x) = \cosh x = \frac{e^x + e^{-x}}{2}, a = 0 \).

8. \( f(x) = \sinh x = \frac{e^x - e^{-x}}{2}, a = 0 \).

9. \( f(x) = \sin x, a = \frac{\pi}{4} \).

10. \( f(x) = \sin x, a = 0 \).