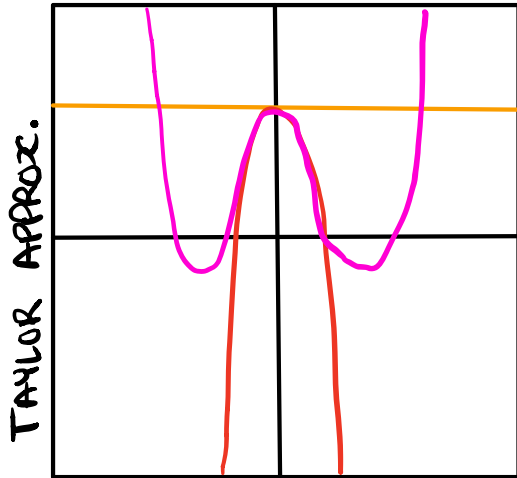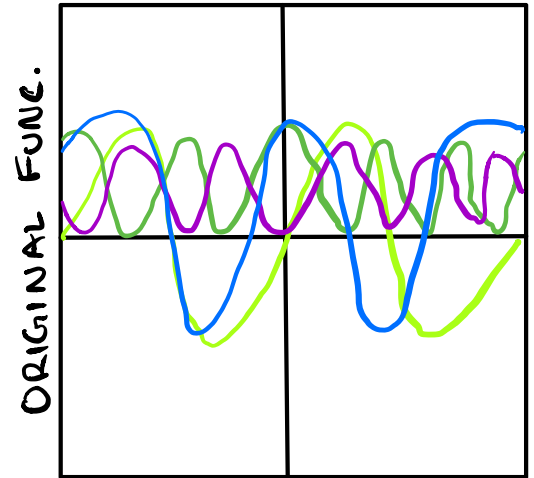## PROBLEM #1.

Given these functions - approximations formed with the Taylor Series select the plot best represented by these approximations.

$$f_0(x) = 1$$

$$f_4(x) = 1 - \frac{x^2}{2} + \frac{x^4}{24}$$

$$f_2(x) = 1 - \frac{x^2}{2}$$
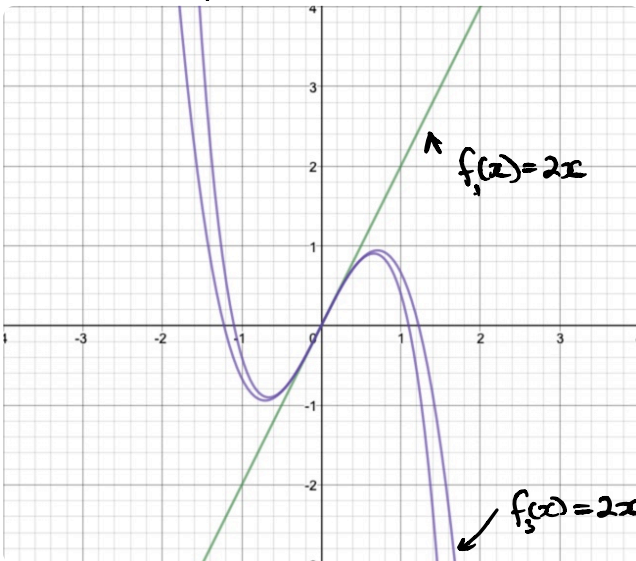
ORIGINAL FUNC.

- ☐ $f(x) = \sin(x)$
- ☐ $f(x) = \cos^2(x)$
- ☐ $f(x) = \sin^2(x)$
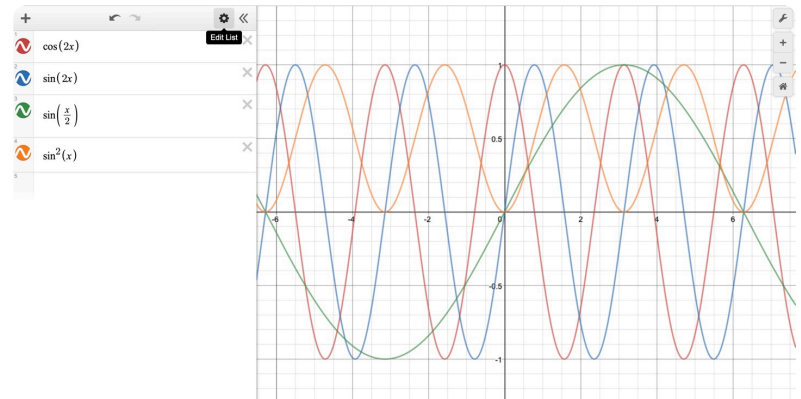- ☑ $f(x) = \cos(x)$

PROBLEM #2.

$$f_5(x) = 2x - \frac{4x^3}{3} - \frac{4x^5}{15}$$

$$f_1(x) = 2x$$

$$f_3(x) = 2x - \frac{4x^3}{3}$$

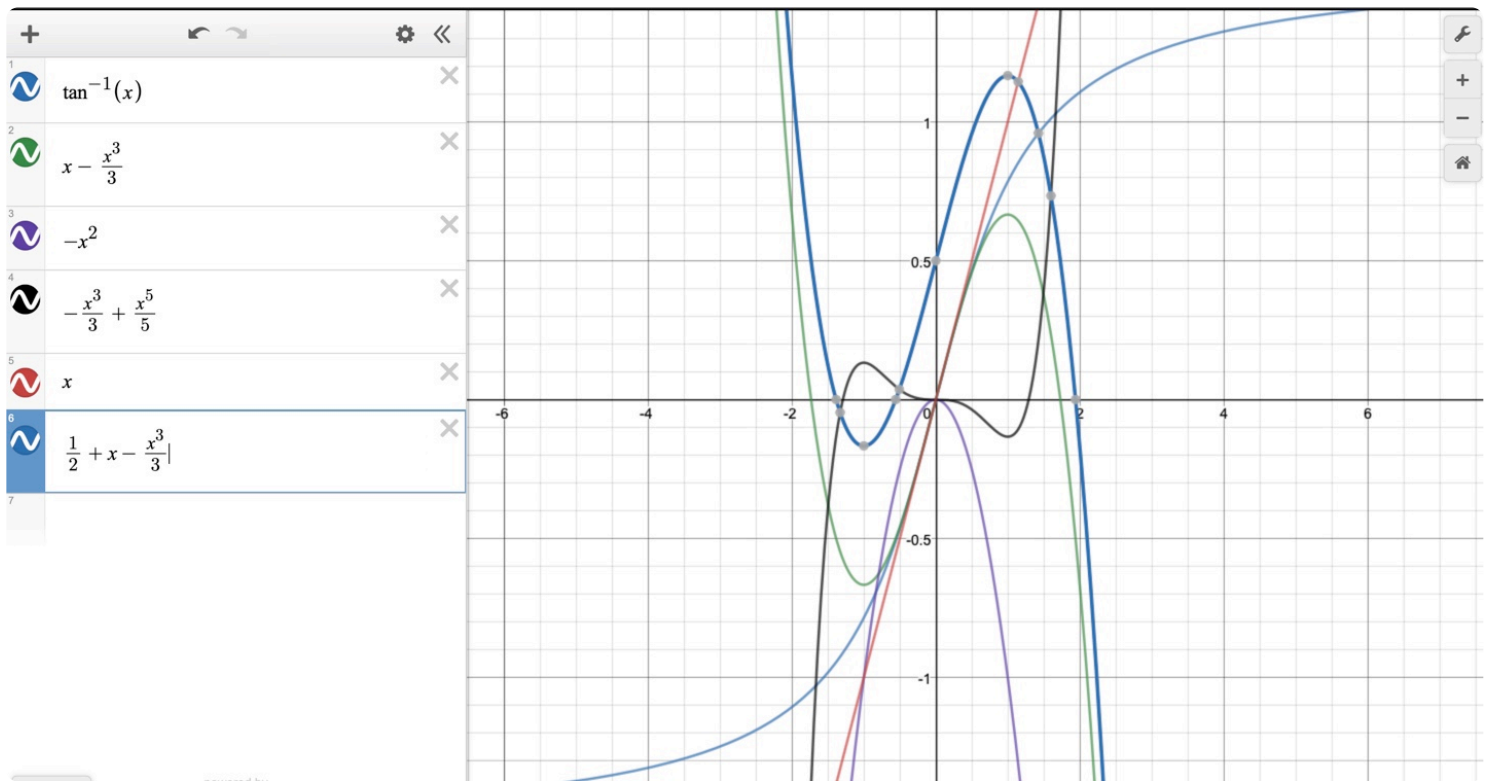Taylor Series Approx.

Original Functions

- ☐ $\cos(2x)$
- ☑ $\sin(2x)$
- ☐ $\sin(x/2)$
- ☐ $\sin^2(x)$

Which of these functions can be used to approximate

$f(x) = \tan^{-1}(x)$

☑ $f_3(x) = \dfrac{-x^3}{3} + x$

☐ $f_2(x) = -x^2$

☐ $f_5(x) = \dfrac{x^5}{5} - \dfrac{x^3}{3}$

☑ $f_1(x) = x$

☐ $f_3(x) = -\dfrac{x^3}{3} + x + \dfrac{1}{2}$

If the function to model is $f(x) = \sin x$, and the Taylor Series approximation is $f(x) = x - \dfrac{x^3}{6}$, which order is the model
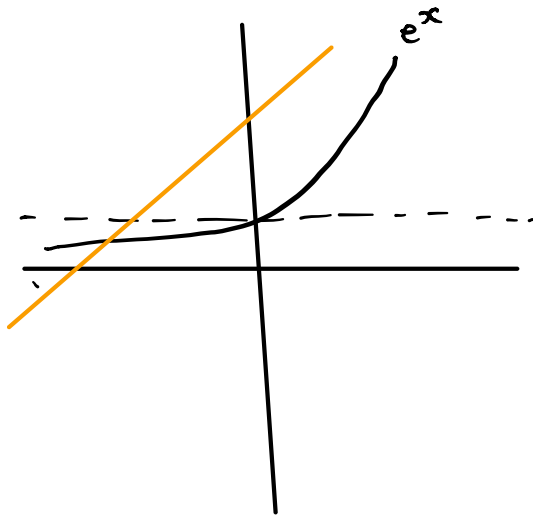
☐ Zeroeth order   ☐ Sixth order

☐ first order   ☐ none of the above

☑ third order

PROBLEM # 5.

Is the line an approximation of the euler exponential?

If it is what is it's approximation order?

- ☐ first
- ☐ second
- ☐ third
- ☑ not a correct approx.