Congratulations! You passed!

TO PASS 80% or higher

Keep Learning

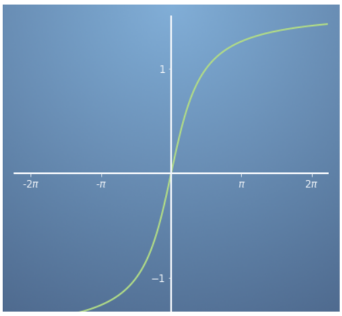
GRADE
100%

Taylor series - Special cases

TOTAL POINTS 5

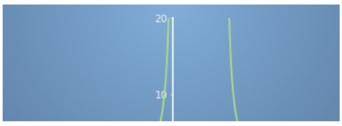
1. The graph below shows the function $f(x) = \tan^{-1}(x)$

1 / 1 point



2. The graph below shows the discontinuous function $f(x) = \frac{2}{(x^2 - x)}$. For this function, select the starting points that will allow a Taylor approximation to be made.

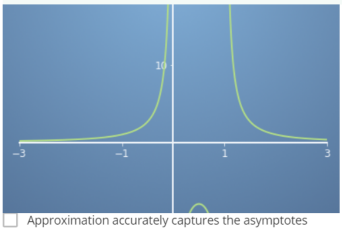
1 / 1 point



✓ **Correct**
A Taylor approximation centered at $x = -3$ will allow us to approximate $f(x)$ for $x < 0$ only.

☑ $x = 2$

✓ **Correct**
A Taylor approximation centered at $x = 2$ will allow us to approximate $f(x)$ for $x > 1$only.

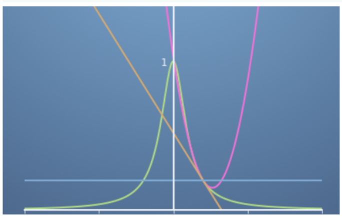


☐ Approximation accurately captures the asymptotes

☐ This is a well behaved function

☑ Approximation ignores segments of the function

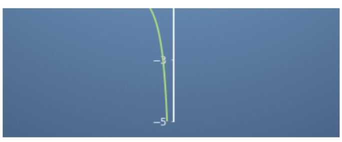
✓ **Correct**
Due to the discontinues function and the range of x values in which it remains well behaved, the starting point of the Taylor series dictates the domain of the function we are trying to approximate.



☑ It is a discontinuous function in the complex plane

✓ **Correct**
Although this function is well behaved in the real plane, in the imaginary plane, the asymptotes limit its convergence and the behaviour of the Taylor expansion, which is shown to behave badly for functions that are discontinuous.

☐ Function does not differentiate well



○ $f(x) = 1/4 + x/16 - O(\Delta x^2)$

○ $f(x) = 1/4 - (x-4)/16 + O(\Delta x)$

◉ $f(x) = 1/4 - (x-4)/16 + O(\Delta x^2)$

○ $f(x) = 1/4 - x/16 + O(\Delta x^2)$

✓ **Correct**
Second order accurate means we have a first order Taylor series. All the terms above are sufficiently small, assuming Δx is small.