Name: _____ Mark: _____

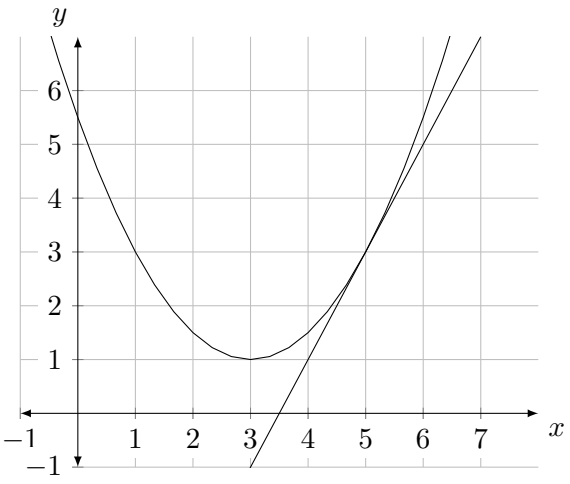
Mini-math AP Calculus BC: Friday, February 11, 2022 (12 minutes)

1. (2 points) Determine whether the following series converges or diverges:

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$$

2. (2 points) If a function f is approximated by the third order Taylor polynomial $2 - 5(x-2) + 4(x-2)^2 - 3(x-2)^3$ centred at $x = 2$, what is $f'''(2)$?

3. (2 points) The figure below shows the graph of the differentiable function f and the line tangent to the graph of f at the point $(5, 3)$. Let g be the function given by $g(x) = \int_5^x f(t)\,dt$. Find the 2nd order Taylor polynomial for $g(x)$ centred at $a = 5$.



4. (2 points) Suppose we know the following bounds:

$$|f^{(2)}(c)| \leq 2, \quad |f^{(3)}(c)| \leq 5, \quad |f^{(4)}(c)| \leq 3,$$

for any c on the interval $[0, 1]$. Use the Lagrange error bound to estimate the absolute value of the error in using a 3rd degree Maclaurin polynomial to approximate $f(0.1)$.