Lagrange Error Bound

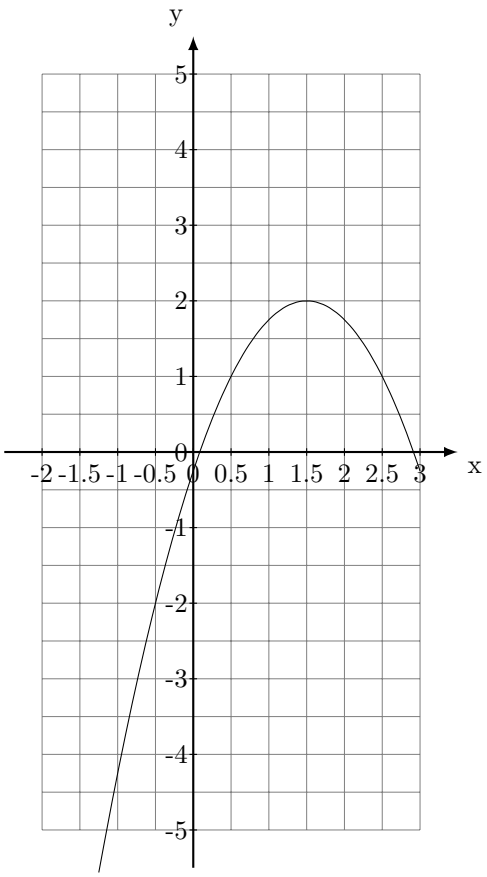
Recall: *Lagrange Error Bound*

$$\text{Error} = |f(x) - P_n(x)| \leq \frac{|x-c|^{n+1}}{(n+1)!} \max\left[f^{(n+1)}(z)\right] \text{ where } z \text{ is between } x \text{ and } c.$$

1. The degree 4 Taylor Polynomial for $f(x)$ centered about $x = 2$ is given by:

$$P_4 = 9 + \frac{1}{7}(x-2)^3 + 7(x-2)^4.$$

Using infromation from the graph of $y = f^{(5)}(x)$ below and the Lagrange error bound, approximate the maximum value of $|P_4(1.5) - f(1.5)|$.



2. Consider the Taylor Polynomial for f given by $P_3(x) = -9 + \frac{3}{7}(x-3)^2 - \frac{1}{9}(x-3)^3$. The fourth derivative of $f(x)$ satisfies the inequality $\left|f^{(4)}(x)\right| \leq 85$ for all $x \in [3, 3.3]$. Find an upper bound for the approximation of $|f(3.3) - P_3(3.3)|$.