

## MECH105: Homework 8

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### Problem 1

Use zero through third-order Taylor Series Expansions to predict  $f(3)$  for

$$f(x) = 25x^3 + -6x^2 + 7x - 88$$

using a base point at  $x = 1$ . Compute the true percent relative error for each approximation.

### Problem 2

Use forward and backward difference approximations of  $O(h)$  and a centered difference approximation of  $O(h^2)$  to estimate the first derivative of the function described in problem 1. Evaluate the derivative at  $x = 2$  using a step size of  $h = 0.25$ . Compare your results with the true value of the derivative. Interpret your results on the basis of the remainder term of the Taylor series expansion.