

5. [12 points] Let  $f(x)$  be a differentiable function defined for all real  $x$  with derivative

$$f'(x) = (e^{x-1}) x^4(x+4)(x-3)^2.$$

- a. [3 points] Find the  $x$ -coordinates of all critical points of  $f(x)$ .

**Answer:** critical point(s) at  $x =$  \_\_\_\_\_

- b. [6 points] Find the  $x$ -coordinates of all local extrema of  $f(x)$ . If there are none of a particular type, write NONE.

*Justify your answers, and be sure to show enough evidence to demonstrate that you have found all local extrema.*

**Answer:** local min(s) at  $x =$  \_\_\_\_\_

**Answer:** local max(es) at  $x =$  \_\_\_\_\_

- c. [3 points] Suppose  $f(1) = -7$ . Use the tangent line approximation to  $f(x)$  at  $x = 1$  to estimate  $f(1.1)$ .

**Answer:**  $f(1.1) \approx$  \_\_\_\_\_