

Name _____

1. (5 points) A function $f(x)$ satisfies all of the following conditions:

- $f(-2) = 256$, $f(-1) = 162$, and $f(2) = 0$.
- $f'(x) = 5(x + 2)(x - 2)^3$.
- $f''(x) = 20(x + 1)(x - 2)^2$.

(a) Find all critical points for $f(x)$. Write each answer as an ordered pair (x, y) .

(b) Find all inflection points for $f(x)$. Write each answer as an ordered pair (x, y) .

(c) For $-3 \leq x \leq 3$, sketch a plausible graph of $f(x)$. Be sure to clearly indicate on your graph the points found in parts (a) and (b).

2. (5 points) A company finds that it can sell 4000 cartons of ice cream when it charges \$4.00 per carton. For every \$0.25 decrease in price, demand increases by 200 cartons.

(a) Find a formula which relates the number of cartons sold, q , to the price per carton, p .

(b) Find a formula for revenue as a function of one variable (either q or p).

(c) Find the price per carton and the corresponding number of cartons sold which will maximize revenue for this company.

(d) What is the maximum revenue for this company?