

Extrema & Inflection Point

Note: a personal copy of this worksheet may be used during the quiz next Tuesday.

1. Let $f(x) = x \ln(x^2)$.

(a) Find the critical points of f .

(b) Find the x and y values of all the local maximums of f .

(c) Find all inflection points of f .

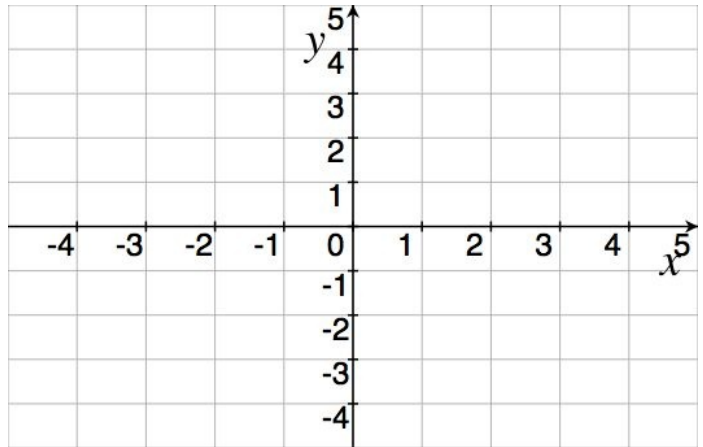
2. Consider the parabola determined by $y = ax^2 + bx + c$ where a , b , and c are real numbers.

(a) Use calculus to find the critical points of the parabola. (Remember, a , b , and c are to be treated as constants.)

(b) Does your answer from above seem familiar? What is another name for the point that you just found?

3. Sketch a graph of a function α that satisfies *all* of the following:

- $\alpha'(x) < 0$, when $x < -3$
- $\alpha'(x) \geq 0$, when $-3 < x < 2$
- $\alpha'(x) = -2$ when $2 < x$
- $\alpha'(2)$ is not defined
- $\alpha'(-3) = \alpha'(1) = 0$
- $\alpha''(x) > 0$, when $x < -2$
& when $1 < x < 2$
- $\alpha''(x) < 0$, when $-2 < x < 1$



4. Consider $g(x) = x^4$. Use g to show that the roots of g'' are not necessarily points of inflection.

5. Let β be the function whose *derivative* is shown below. Find:

(a) the critical points of β .

(b) the x coordinates of any local maximums.

(c) the x coordinates of any points of inflection

