

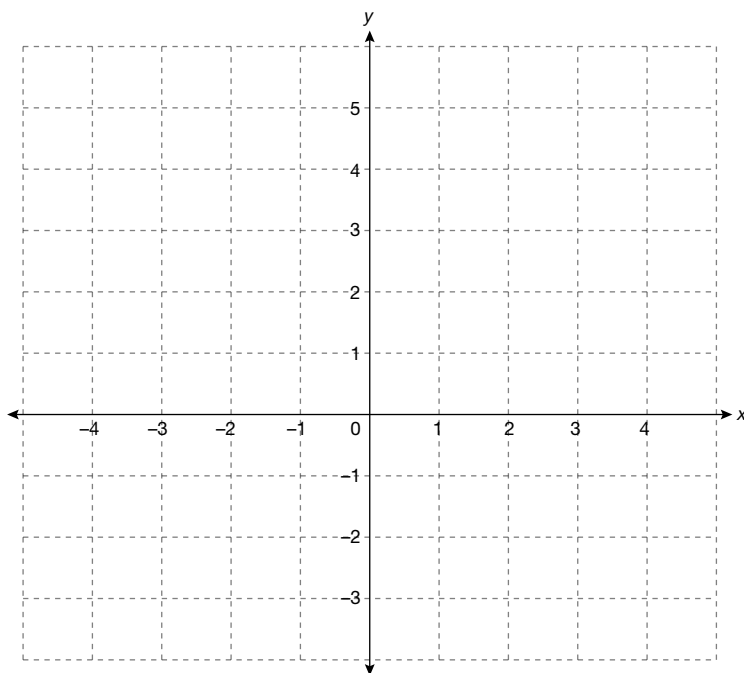


Practice – 1

Once you feel confident with concavity and points of inflection, complete problems 1 to 4. Check your answers by going to the Solutions tab in Moodle.

Instructions: Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

1. Determine where the curve $f(x) = x^4 - x^3 + 2x + 1$ is concave up and where it is concave down. Find the inflection point(s).
2. For the function $f(x) = \sqrt{x}(x - 2)$, use the Second Derivative Test to determine the local maximum and minimum values.
3. Given the function $f(x) = x^3 + 3x^2$,
 - a. find the critical points,
 - b. the intervals of increase and decrease,
 - c. the local extrema,
 - d. all possible inflection points,
 - e. the intervals of concavity and the actual inflection points, and then
 - f. sketch the graph.



4. Sketch the graph of a function with the following characteristics. State any inflection points.

$f'(x)$ Critical points at $x = 0, \frac{3}{2}$

$f''(x)$ Possible inflection points at $x = 0, 1$

Points: $f(-1) = 0, f(0) = 3, f(1) = 4, f(\frac{3}{2}) = \frac{75}{16}$

Intervals	$x < 0$	$0 < x < 1$	$1 < x < \frac{3}{2}$	$x > \frac{3}{2}$
Sign of $f'(x)$	+	+	+	−
Sign of $f''(x)$	−	+	−	−

