

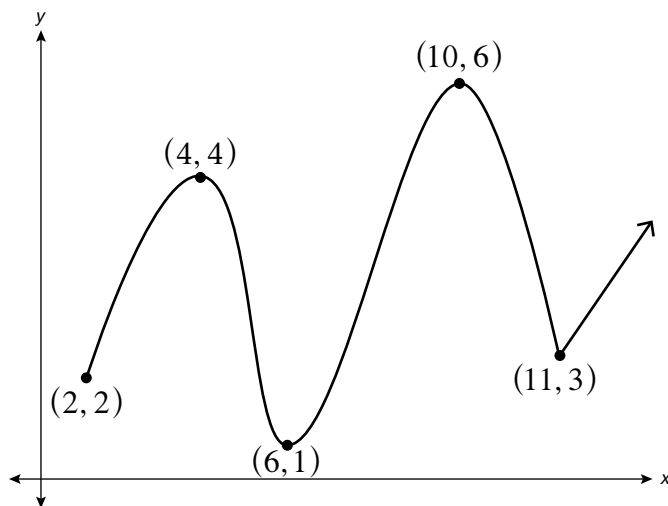


Practice – 1

Once you feel confident with local extrema, complete problems 1 to 7. Check your answers by going to the Solutions tab in Moodle.

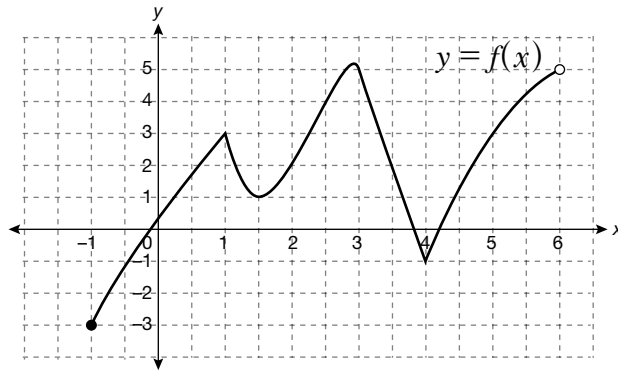
Instructions: Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

1. Using the diagram below, state the coordinates of each of the following.
 - a. local (relative) minimum
 - b. local (relative) maximum
 - c. absolute minimum
 - d. absolute maximum
 - e. critical points



2. Find the critical point(s), intervals of increase and decrease, local maximum, and local minimum for the function $f(x) = 1 + 3x^2 - 2x^3$.
3. Find the absolute maximum and absolute minimum values for the function $f(x) = 2x^2 - 8x + 1$ on the interval $[0, 3]$.
4. Show the polynomial function $f(x) = x^5 + x$ has no critical points, and therefore has no local extrema.

5. Find the value of b if $f(x) = -2x^2 + bx - 7$ has a local maximum at $x = 4$.
6. Give the function $y = f(x)$,
- a. complete the table below by describing the derivative at the points $x = 1, 2, 3, 4, 5, 6$.



Point	Description of Derivative
$x = 1$	
$x = 2$	
$x = 3$	
$x = 4$	
$x = 5$	
$x = 6$	

Note: At $x = 1.5$ the derivative would be zero because the tangent to the curve is horizontal at that point.

- b. state the absolute and local extrema of the function.

7. Sketch the graph of a function for which the following characteristics are true.

1. $f(-4) = 1$, $f(-3) = 1.5$, $f(2) = 4$
2. $f(-1) = f(4) = -2$
3. $f'(-3) = f'(-1) = f'(2) = f'(4) = 0$
4. $f'(x) > 0$ on the interval $[-4, -3) \cup (-1, 2) \cup (4, \infty)$
5. $f'(x) < 0$ on the interval $(-3, -1) \cup (2, 4)$