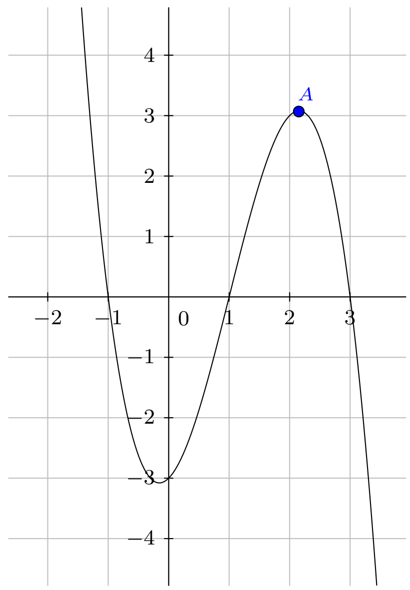
CALCULUS I

Example Readiness Assessment

1. The point A on this graph would be a:



   (a) Local maximum

   (b) Local minimum

   (c) Absolute maximum

   (d) Absolute minimum

2. At any point where a function is increasing, the derivative must be:

   (a) Zero

   (b) Non-existant

   (c) Negative

   (d) Positive

3. The Extreme Value Theorem can be used to find out what information?

   (a) The absolute max/min of a function, for all values.

   (b) The derivative of a function

   (c) Where a function is continuous.

   (d) The absolute max/min of a function, on a closed interval.

4. The Extreme Value Theorem has a familiar hypothesis about which kind of function it can apply to. What is that hypothesis?

   (a) The function must be increasing.

   (b) The function must be decreasing.

   (c) The function must be continuous.

   (d) The function must be differentiable.

5. A critical number of a function f is a number c in the domain where which of these happens?

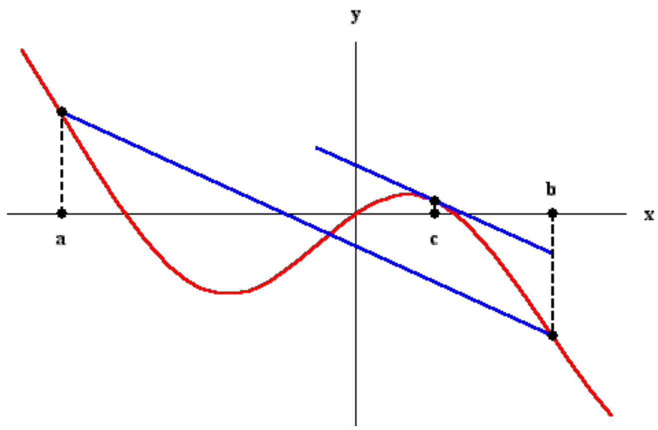
   (a) The function is differentiable at c.

   (b) $f'(c) = 0$.

   (c) The function is not defined at c.

   (d) $f'(c) = 0$, or it does not exist.

6. The following image is often shown with the Mean Value Theorem. What can we assume about the derivative of the function f when $x = c$ and the slope of the line connecting the points where $x = a$ and $x = b$?



(a) The derivative is zero when $x = c$.

(b) All values of the derivative exist between a and b

(c) There is a local maximum when $x = c$

(d) The derivative at $x = c$ is the same as the slope of the line from $x = a$ to $x = b$.

7. What happens at a point of inflection?

(a) The function has a local maximum.

(b) The function has a local minimum.

(c) The graph changes concavity.

(d) The graph changes from increasing to decreasing.

8. Which of these would be described as an optimization problem?

(a) Find the relationship between the change in volume of a sphere and the change in it's radius.

(b) Proving a real zero of an equation exists over a certain interval.

(c) A business owner wanting to maximize profits and minimize costs.

(d) Finding the slope of the tangent line to a curve at a specific point.

9. Optimization problems always require that we find which of the following?

(a) Absolute maximum or minimum of a function.

(b) Local maximum or minimum of a function.

(c) Intervals where a function is increasing or decreasing.

(d) Intervals where a function is concave up or concave down.

10. At any point where a function is decreasing, the derivative must be:

    (a) Zero

    (b) Non-existant

    (c) Negative

    (d) Positive