Question 1 (1 pts)

Let c be a number in the domain D of a function $f(x)$. What is the difference between an absolute maximum and a local maximum?

A. The absolute maximum is the largest function value on the entire domain of the function. Whereas the local maximum is the largest function value for some x close to c.

B. They are the same.

C. The absolute maximum is the largest function value for some x close to c. Whereas the local maximum is the largest function value on the entire domain of the function.

D. An absolute maximum is the value of f when $f(x) \geq f(c)$ for some x close to c. The local maximum is the value of f when $f(c) \geq f(x)$ for all x in the entire domain.

Question 2 (1 pts)

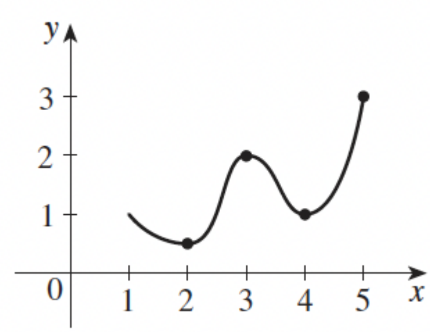
Use the graph to identify the absolute and local maximum and minimum values of the function.

A. Absolute maximum at 5, absolute minimum at 2. Local maximum at 3, local minimum at 4.

B. Absolute maximum at 3, absolute minimum at 1. Local maximum at 2, local minimum at 0.5 and at 1.

C. Absolute maximum at 5, absolute minimum at 2. Local maximum at 3, local minimum at 2 and at 4.

D. Absolute maximum at 3, absolute minimum at 1. Local maximum at 2, local minimum at 1.



Question 3 (1 pts)

We use the Extreme Value Theorem to:

A. Show that a function is continuous on a closed interval $[a, b]$.

B. Prove the existence of local maximum and minimum values of a continuous function on a closed interval $[a, b]$.

C. To show that a function exists on a closed interval $[a, b]$.

D. Prove the existence of absolute maximum and minimum values of a continuous function on a closed interval $[a, b]$.

Question 4 **(1 pts)**

What does Fermat's Theorem mean in terms of critical numbers?

A. For some critical number c, in the domain of f, $f'(c)$ does not exist.

B. If $f'(c)$ exists and $f'(c) = 0$, then f has a local maximum or minimum at c.

C. If f has a local maximum or minimum at c, then c is a critical number of f.

D. If f has a local maximum or minimum at c, then $f'(c)$ does not exist.

Question 5 **(1 pts)**

We use Rolle's Theorem to:

A. Show that the derivative of a function exists.

B. Show that the graph of a function has a horizontal tangent line.

C. Show that there exists a continuous function.

D. If f has a local maximum or minimum at c, then $f'(c)$ does not exist.

Question 6 **(1 pts)**

We use the Mean Value Theorem to:

A. Show that there is at least one point, on the graph of a function, where the slope of the tangent line is the same as the slope of the secant line.

B. Show that the derivative of a function exists.

C. Show that a function f is continuous on the closed interval $[a, b]$.

D. Show that the graph of a function has a horizontal tangent line.

Question 7 **(1 pts)**

f(x) = $\frac{1}{x}$. Find the number c that satisfies the conclusion of the Mean Value Theorem on the interval [1, 3].

A. $c = \pm\sqrt{\frac{3}{2}}$

C. $c = \sqrt{\frac{2}{3}}$

B. $c = \sqrt{3}$

D. $c = \pm\sqrt{3}$

Question 8 **(1 pts)**

When will a function f be a constant function?

A. When $f'(x)$ does not exist.

B. When $f(x)$ is continuous.

C. When $f(x)$ is everywhere differentiable.

D. When $f'(x) = 0$.

Question 9 **(1 pts)**

Suppose that c is a critical number of a continuous function f. Fill in the blank:

If f' changes sign from positive to negative at c, then ______.
If f' changes sign from negative to positive at c, then ______.

A. f has no local maximum.
   f has no local minimum.

B. f has a local maximum at c.
   f has a local minimum at c.

C. f has an absolute maximum at c.
   f has an absolute minimum at c.

D. f has a local minimum at c.
   f has a local maximum at c.

Question 10 **(1 pts)**

Use the graph to identify the local maximum and minimum values of the function.

A. Local minimum at $x = 3$. No Local maximum.

B. Local minimum and maximum at $x = 3$.

C. No local maximum or minimum.

D. No local minimum, local maximum at $x = 3$.