Created by Rukiyah Walker

Question 1 **(1 pts)**

We use the Intermediate Value Theorem to:

A. To show that a function is continuous.

B. To show that for a continuous function $f(x)$, a solution to $f(x) = 0$ exists.

C. To show that a function is discontinuous.

D. To show that $\lim_{x \to a} f(x)$ does not exist.

Question 2 **(1 pts)**

What do we need to check in order to use the Intermediate Value Theorem?

A. Our function $f(x)$ is continuous on the closed interval $[a, b]$.

B. $f(a) \neq f(b)$.

C. $f(a) \leq N \leq f(b)$, where N is some number.

D. All of the above.

Question 3 **(1 pts)**

The derivative of a function f is:

A. $f'(a) = \lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$

B. The value a, when $f(a) = 0$.

C. When the limit of a function does not exist.

D. The value at which a function is discontinuous.

Question 4 **(1 pts)**

What is one interpretation of the average rate of change?

A. Instantaneous velocity.

B. $f'(a) = \lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$

C. The average change in position with respect to time.

D. The derivative of a function f.

Question 5 **(1 pts)**

What is the instantaneous rate of change?

A. The derivative of a function f.

B. Acceleration.

C. The point at which a function is discontinuous.

D. When a function $f(x) = 0$.

Question 6 **(1 pts)**

The derivative of a function f is equal to 0 when:

A. The graph of the function crosses the x-axis.

B. When the slope of the tangent line is 0.

C. At the point $x = 0$.

D. The derivative does not exist.

Question 7 **(1 pts)**

What does $\frac{dy}{dx}|_{x=a} = f'(a)$ mean?

A. The average rate of change is equal to $f'(a)$.

B. The derivative of y divided by the derivative of x is equal to $f'(a)$.

C. $f(x) = f'(a)$ when $x = a$.

D. The derivative of a function f at the point $x = a$ is equal to $f'(a)$.

Question 8 **(1 pts)**

Suppose we have a function f that represents the position of a particle. The acceleration of the particle can be represented by:

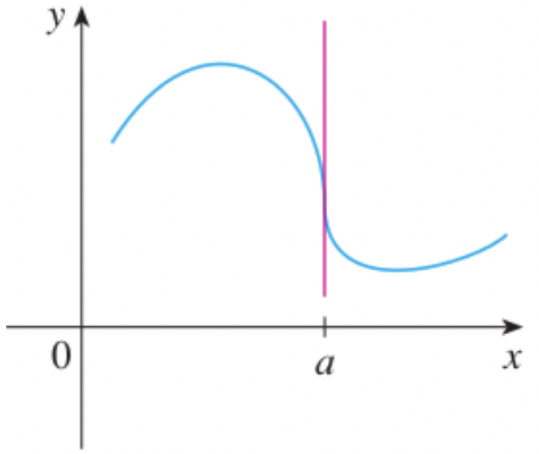
A. The velocity.

B. $f'(x)$.

C. The second derivative of the function.

D. The instantaneous rate of change.

Question 9 (1 pts)



Is the function, represented by the graph above, differentiable? Why?

A. No, since the slope of the tangent line is equal to $\pm\infty$.

B. Yes, since $\lim_{x\to a^-} f(x) = \lim_{x\to a^+} f(x)$.

C. Yes, since there is no jump discontinuity.

D. No, since $\lim_{x\to a} f(x) = 0$

Question 10 (1 pts)

Suppose we have the function $f(x) = x^3 - x^2$.

Using the power and difference rules for derivatives, what is $f'(x)$?

A. $3x^3 - 2x^2$

B. $3x^2 - 2x$

C. $3x - 2x$

D. $3x^4 - 2x^3$