

2. Differentiation: Definition and Fundamental Properties Starter Quiz · 课前小测

AP Calculus AB

Name: _____ Score: _____

1. Find the average rate of change of $f(x) = x^2$ on $[1, 3]$.

2. Which expression is the limit definition of $f'(x)$?
☐ $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$
☐ $\frac{f(x+h) - f(x)}{h}$ with $h = 0$
☐ $\lim_{h \rightarrow 0} (f(x+h) - f(x))$
☐ $f(x+h) - f(x)$
3. A table gives $f(1.9) = 4.2$ and $f(2.1) = 5.8$. Use the symmetric difference quotient to estimate $f'(2)$.

4. Which implication is **true**?
☐ continuous at $c \Rightarrow$ differentiable at c
☐ differentiable at $c \Rightarrow$ continuous at c
☐ discontinuous at $c \Rightarrow$ differentiable at c
☐ neither implies anything
5. What is $\frac{d}{dx}[x^5]$?
☐ $5x^4$
☐ x^4
☐ $5x^6$
☐ $4x^5$
6. What is $\frac{d}{dx}[12]$?

7. What is $\frac{d}{dx}[\sin x]$?
☐ $\cos x$
☐ $-\cos x$

☐ $-\sin x$

☐ $\sin x$

8. The derivative of $f \cdot g$ equals $f' \cdot g'$.
☐ True ☐ False
9. The Quotient Rule numerator for $\frac{f}{g}$ is...
☐ $f'g'$
☐ $f'g - fg'$
☐ $fg' - f'g$
☐ $f'g + fg'$
10. You can compute $f'(x)$ by setting $h = 0$ directly in $\frac{f(x+h) - f(x)}{h}$.
☐ True ☐ False

2. Differentiation: Definition and Fundamental Properties Answers · 答案

AP Calculus AB

1. **4**

$$\frac{9-1}{3-1} = \frac{8}{2} = 4.$$

2. $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

The derivative is the limit of the difference quotient as $h \rightarrow 0$.

3. **8**

$$\frac{5.8 - 4.2}{2(0.1)} = \frac{1.6}{0.2} = 8.$$

4. **differentiable at $c \Rightarrow$ continuous at c**

Differentiable forces continuous; the reverse is false.

5. $5x^4$

Bring down 5, reduce exponent: $5x^{5-1} = 5x^4$.

6. **0**

The derivative of any constant is 0.

7. $\cos x$

$$\frac{d}{dx}[\sin x] = \cos x.$$

8. **False**

It is $f'g + fg'$, not $f'g'$.

9. $f'g - fg'$

Numerator is $f'g - fg'$, over g^2 .

10. **False**

That gives $\frac{0}{0}$; you must take the limit after simplifying.