

## Starter Quiz

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  $f'(x)$ ?

☐  $\frac{f(x+h) - f(x)}{h}$  with  $h = 0$

☐  $\lim_{h \rightarrow 0} (f(x+h) - f(x))$

☐  $f(x+h) - f(x)$

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

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**?

☐ discontinuous at  $c \Rightarrow$  differentiable at  $c$

☐ continuous at  $c \Rightarrow$  differentiable at  $c$

☐ neither implies anything

☐ differentiable at  $c \Rightarrow$  continuous at  $c$

5. What is  $\frac{d}{dx}[x^5]$ ?

☐  $5x^4$

☐  $x^4$

☐  $4x^5$

☐  $5x^6$

6. What is  $\frac{d}{dx}[12]$ ?

\_\_\_\_\_

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

☐  $-\cos x$

☐  $\cos x$

☐  $\sin x$

8. The derivative of  $f \cdot g$  equals  $f' \cdot g'$ .

☐ True

☐ False

9. The Quotient Rule numerator for  $\frac{f}{g}$  is...

☐  $f'g + fg'$

☐  $fg' - f'g$

☐  $f'g - fg'$

☐  $f'g'$

10. The derivatives of  $\cot x$  and  $\csc x$  both carry a minus sign.

☐ True

☐ False

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. **True**

$-\csc^2 x$  and  $-\csc x \cot x$  – the "co-" functions carry a minus.