

Starter Quiz ·

AP Calculus AB

Name: _____ Score: _____

1. The Chain Rule gives $\frac{d}{dx}[f(g(x))]=$

- ☐ $f'(g(x))$
- ☐ $f'(x) \cdot g'(x)$
- ☐ $f(g'(x))$
- ☐ $f'(g(x)) \cdot g'(x)$

2. Differentiating with respect to x , $\frac{d}{dx}[y^2]=$

- ☐ $2x$
- ☐ $2y$
- ☐ $2y\frac{dy}{dx}$
- ☐ 2

3. The derivative of an inverse is $(f^{-1})'(x)=$

- ☐ $f'(x)$
- ☐ $\frac{1}{f'(x)}$
- ☐ $-f'(x)$
- ☐ $\frac{1}{f'(f^{-1}(x))}$

4. What is $\frac{d}{dx}[\arcsin x]$?

- ☐ $\cos x$
- ☐ $\frac{1}{\sqrt{1-x^2}}$
- ☐ $-\frac{1}{\sqrt{1-x^2}}$
- ☐ $\frac{1}{1+x^2}$

5. Which rule does $y = x^2 \sin x$ need at the top level?

- ☐ chain rule only
- ☐ product rule

☐ power rule only

6. For $f(x) = x^3 - 2x^2 + 5x$, $f'(x) = 6x - 4$. Find $f'(2)$.

7. For $y = (2x + 1)^3$, find y' at $x = 0$. (Chain rule: $3(2x + 1)^2 \cdot 2$.)

8. For $x^2 + y^2 = 25$, $\frac{dy}{dx} = -\frac{x}{y}$. Find the slope at $(3, 4)$ (a decimal).

9. If $f(2) = 5$ and $f'(2) = 4$, find $(f^{-1})'(5)$.

10. For $y = \arctan(3x)$, $y' = \frac{3}{1 + 9x^2}$. Find y' at $x = 0$.

AP Calculus AB

1. $f'(g(x)) \cdot g'(x)$

Outer derivative at the inner, times the inner derivative.

2. $2y \frac{dy}{dx}$

Chain rule: $2y$ times the inner derivative $\frac{dy}{dx}$.

3. $\frac{1}{f'(f^{-1}(x))}$

One over the original derivative at the matching input $f^{-1}(x)$.

4. $\frac{1}{\sqrt{1-x^2}}$

arcsin has the root form $\frac{1}{\sqrt{1-x^2}}$.

5. **product rule**

It is a product of x^2 and $\sin x \rightarrow$ product rule.

6. **8**

$f'(2) = 6(2) - 4 = 8.$

7. **6**

$y' = 6(2x + 1)^2$; at 0: $6(1) = 6.$

8. **-0.75**

$-\frac{3}{4} = -0.75.$

9. **0.25**

$f^{-1}(5) = 2$, so $\left(f^{-1}\right)'(5) = \frac{1}{f'(2)} = \frac{1}{4}.$

10. **3**

At $x = 0$: $\frac{3}{1+0} = 3.$