

AP Calculus AB - Derivatives of Inverse Functions - Test

Common Core AP CALC AB 3.3, AP CALC AB 3.4, AP CALC AB 3.5, AP CALC AB 3.6 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

This test checks derivatives of inverse functions, derivatives of inverse trigonometric functions, choosing differentiation methods and higher-order derivatives (AP Calculus AB, 3.3, 3.4, 3.5, 3.6). It has 8 questions worth 20 points in total. Allow 45 minutes, work without notes, and show all work, since justification earns points on the AP exam.

About this test

- Grade: AP Calculus AB
- Chapter: Derivatives of Inverse Functions
- Standards: AP CALC AB 3.3, AP CALC AB 3.4, AP CALC AB 3.5, AP CALC AB 3.6
- Time: 45 minutes
- Total: 20 points

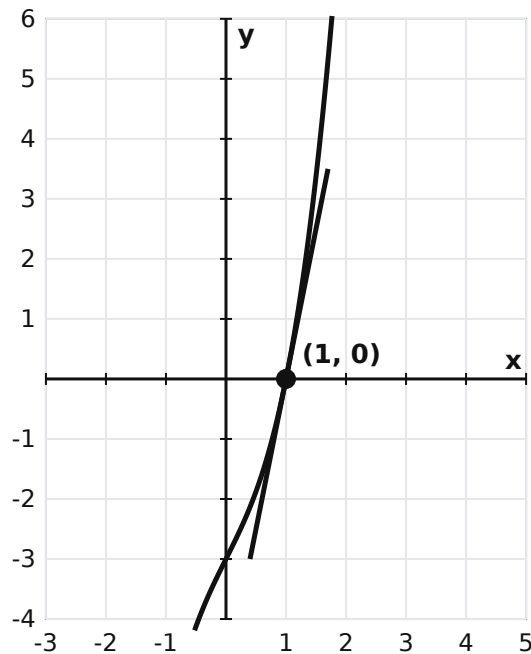
Question 1 - Inverse from a table [3 pts]

x	f(x)	f'(x)
1	4	2
2	9	5
3	15	8

Values of f and f'.

The table gives values of an invertible function f . Find (a) $(f^{-1})'(9)$ and (b) $(f^{-1})'(15)$, and (c) the value of $f^{-1}(4)$. (1 point each)

Question 2 - Inverse of a cubic [2 pts]



Graph of $f(x) = x^3 + 2x - 3$.

Let $f(x) = x^3 + 2x - 3$. Find $(f^{-1})'(0)$.

Question 3 - Inverse trig derivatives [2 pts]

Differentiate $g(x) = \sin^{-1}x + \tan^{-1}(2x)$.

Question 4 - Inverse trig and a root [2 pts]

Differentiate $h(x) = \tan^{-1}(\sqrt{x})$.

Question 5 - Second derivative [3 pts]

Find $f''(x)$ for $f(x) = x^5 - 2x^3 + \sin x$, and then evaluate $f''(0)$.

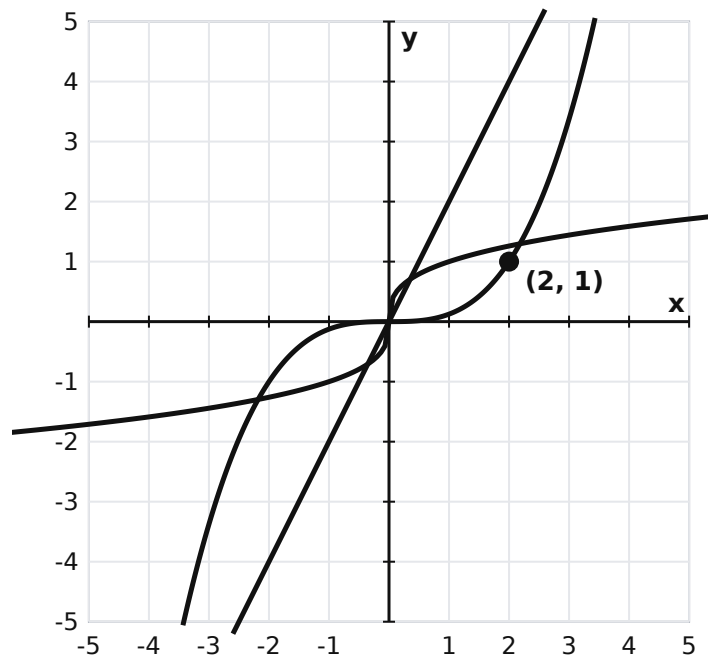
Question 6 - Acceleration [2 pts]

A runner's position in meters is $s(t) = 2t^3 - 15t^2 + 36t$ after t seconds. Find the acceleration at $t = 3$ and the times when the velocity is zero.

Question 7 - Choosing rules [3 pts]

Name the best rule and differentiate: (a) $e^x \cos x$ (b) $\frac{\ln x}{x^2}$ (c) $(5x-1)^4$. (1 point each)

Question 8 - Inverse in context [3 pts]



Graphs of f and $g = f^{-1}$.

The volume of a cube-shaped planter is related to its side by $f(x) = \frac{x^3}{8}$. Let $g = f^{-1}$. (a) Find $f(2)$ and $f'(2)$. (1 point) (b) Find $g'(1)$. (1 point) (c) Write the tangent line to g at $x=1$. (1 point)