

AP Calculus AB - Power, Sum and Basic Function Derivative Rules - Test

Common Core AP CALC AB 2.5, AP CALC AB 2.6, AP CALC AB 2.7 · maths-pdf.fr/en/

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

This test checks the power rule, sum and constant multiple rules, derivatives of $\sin x$, $\cos x$, e^x and $\ln x$, and tangent and normal lines (AP Calculus AB, 2.5, 2.6, 2.7). 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: Power, Sum and Basic Function Derivative Rules
- Standards: AP CALC AB 2.5, AP CALC AB 2.6, AP CALC AB 2.7
- Time: 45 minutes
- Total: 20 points

Question 1 - Polynomial derivative [2 pts]

Find $f'(x)$ for $f(x) = 5x^4 - 3x^3 + 2x - 8$.

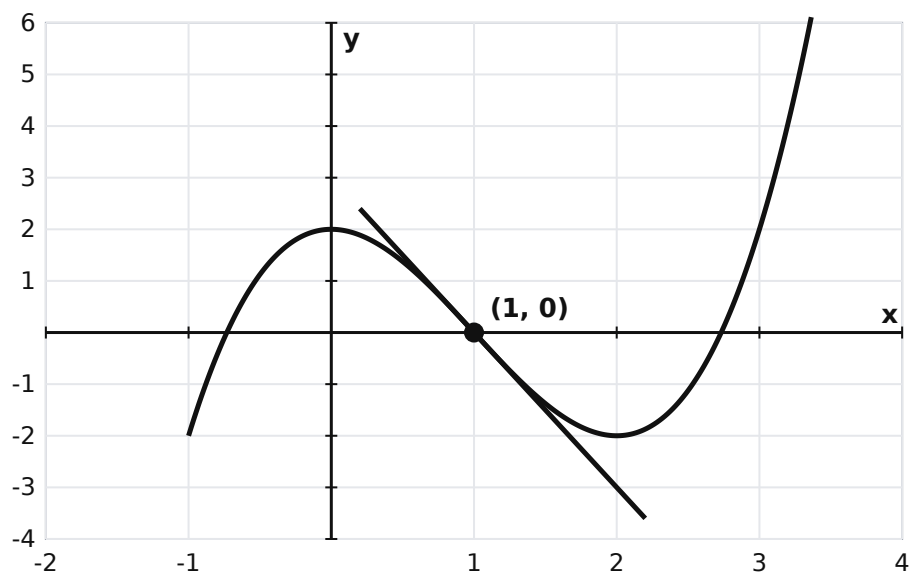
Question 2 - Roots and reciprocals [2 pts]

Find $f'(x)$ for $f(x) = 4\sqrt{x} - \frac{3}{x} + x^{5/2}$.

Question 3 - Trig, exponential and log [2 pts]

Find $\frac{d}{dx}[2\cos x + 3e^x - \ln x]$.

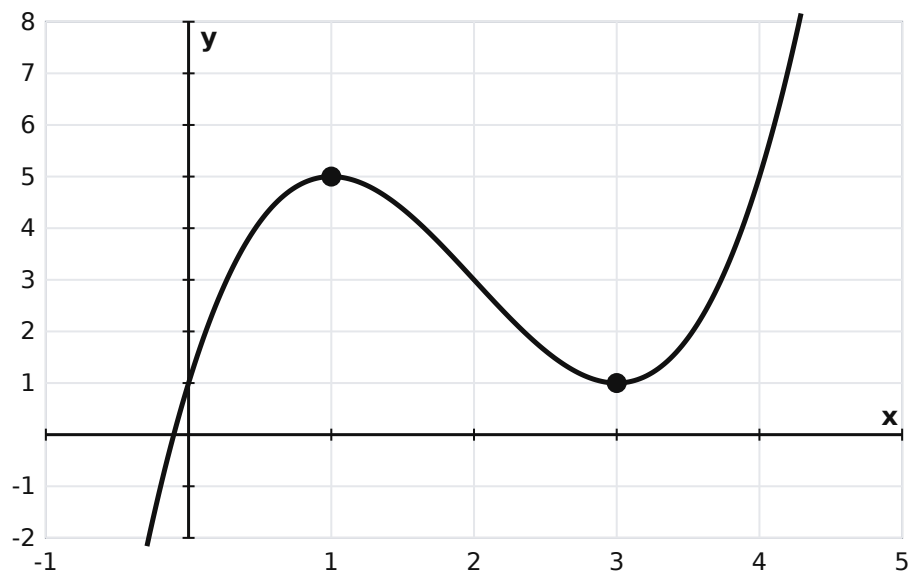
Question 4 - Tangent line [3 pts]



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

Find the equation of the tangent line to $f(x) = x^3 - 3x^2 + 2$ at $x = 1$.

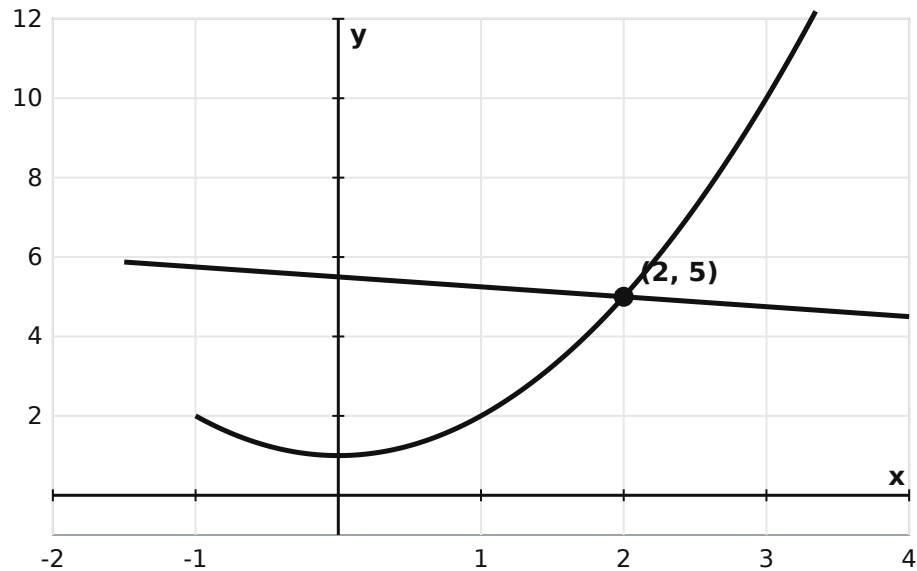
Question 5 - Horizontal tangents [3 pts]



Graph of $g(x) = x^3 - 6x^2 + 9x + 1$.

Find the points where the graph of $g(x) = x^3 - 6x^2 + 9x + 1$ has a horizontal tangent line.

Question 6 - Normal line [2 pts]



Graph of $f(x) = x^2 + 1$ and the normal line at $x = 2$.

Find the equation of the normal line to $f(x) = x^2 + 1$ at $x = 2$.

Question 7 - Velocity in context [3 pts]

A ball rolls so that its position in feet is $s(t) = t^3 - 9t^2 + 15t$ after t seconds. (a) Find the velocity $v(t)$. (1 point) (b) Find the velocity at $t = 2$. (1 point) (c) When is the ball at rest? (1 point)

Question 8 - Unknown constants [3 pts]

The function $f(x) = x^2 + bx + c$ has the tangent line $y = 3x + 1$ at $x = 1$. Find b and c .