

AP Calculus
Chain Rule practice

Name Key

Find the derivative of $g(t)$.

1. $g(t) = \frac{1}{\sqrt{3t^2+1}}$

$g(t) = (3t^2+1)^{-1/2}$

$g'(t) = -\frac{1}{2}(3t^2+1)^{-3/2} \cdot 6t$

$= -3t(3t^2+1)^{-3/2}$

2. $\cot^5(2t+1)^3$

$= 5(\cot(2t+1))^4 \cdot (-\csc^2(2t+1)) \cdot 3(2t+1)^2 \cdot 2$

$= -30(\cot(2t+1))^4 (\csc^2(2t+1)^3) (2t+1)^2$

3. $g(t) = \tan(\cos t)$

$g'(t) = \sec^2(\cos t) \cdot -\sin t$

$= -\sin t \cdot \sec^2(\cos t)$

4. $g(t) = (t^2+t)\sin^2 t$

$g'(t) = (2t+1) \cdot 2\sin t \cdot \cos t + \sin^2 t (2t+1)$

Write the equation of the tangent line to the curve $y = \cos^3 x$ at $x = \pi$

$y = (\cos x)^3$

$y = (\cos \pi)^3$

$y = -1$

point of tangency $(\pi, -1)$

$\frac{dy}{dx} = 3\cos^2 x (-\sin x)$

$= 3\cos^2 \pi (-\sin \pi)$

$= 3(0) = 0$

$y = -1$