AP Calculus
Chain Rule practice

Name key

Find the derivative of $g(t)$.

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

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

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

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

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

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

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

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

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

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

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

u v

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

$u \cdot v' + v \cdot u'$

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 $(\pi, -1)$

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

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

$= 3(0) = 0$

$y = -1$