AP Calculus AB
Class Notes

Name Key

Chain Rule

The derivative of $f(g(x))$ is $f'(g(x))*g'(x)$

1. $y=\sqrt{x^3+7}$

$y=(x^3+7)^{1/2}$

$y'=\frac{1}{2}(x^3+7)^{-1/2}(3x^2)$

$y'=\frac{3x^2}{2(x^3+7)^{1/2}}$

2. $y=\frac{2}{(5x+1)^2}$

$y=2(5x+1)^{-2}$

$y'=-4(5x+1)^{-3}(5)$

$y'=\frac{-20}{(5x+1)^3}$

3. $y=\tan 6x$

$y'=\sec^2(6x)\cdot 6$

$y'=6\sec^2(6x)$

4. $y=(x^2+5)^3(x^3-1)^4$

$y'=3(x^2+5)^2(2x)(x^3-1)^4+(x^2+5)^3 4(x^3-1)^3(3x^2)$

$y'=6x(x^2+5)^2(x^3-1)^4+12x^2(x^2+5)^3(x^3-1)^3$

$y'=6x(x^2+5)^2(x^3-1)^3[(x^3-1)+2x(x^2+5)]$

$y'=6x(x^2+5)^2(x^3-1)^3[x^3-1+2x^3+10x]$

$y'=6x(x^2+5)^2(x^3-1)^3(3x^3+10x-1)$

5. $y=\cos^3 x^2$

$y=(\cos x^2)^3$

$y'=3(\cos x^2)^2(-\sin x^2)(2x)$

$y'=-6x\cos^2(x^2)\sin(x^2)$

6. $y=\sqrt{\sin(6x)}$

$y=(\sin(6x))^{1/2}$

$y'=\frac{1}{2}(\sin(6x))^{-1/2}(\cos(6x))(6)$

$y'=\frac{3\cos(6x)}{(\sin(6x))^{1/2}}$

7. $y=e^{\tan x}$

$y'=e^{\tan x}\cdot\sec^2 x$

$\frac{d}{dx}e^u=e^u\cdot u'$

8. $y=3^{x^2}$

$y'=3^{x^2}\cdot\ln 3\cdot 2x$

$\frac{d}{dx}a^u=a^u\cdot\ln a\cdot u'$