

MATH 100 – WORKSHEET 7
TRIGONOMETRIC FUNCTIONS; THE CHAIN RULE

1. TRIGONOMETRIC FUNCTIONS

Fact. $(\sin x)' = \cos x$, $(\cos x)' = -\sin x$

(1) (Trig functions)

(a) Interpret $\lim_{h \rightarrow 0} \frac{\sin h}{h}$ as a derivative and find its value.

(b) Differentiate $\tan x = \frac{\sin x}{\cos x}$. Using the quotient rule, $\frac{d}{dx} \tan x =$

(2) What is the equation of the line tangent the graph $y = T \sin x + \cos x$ at the point where $x = \frac{\pi}{4}$?

2. THE CHAIN RULE

Fact. $(f(g(x)))' = f'(g(x))g'(x)$ or $\frac{d}{dx}(f(g(x))) = \frac{df}{dg} \cdot \frac{dg}{dx}$.

(1) Write the function as a composition and then differentiate.

(a) $\sqrt{2x+1}$

(b) e^{3x}

(c) $(7x + \cos x)^n$.

(2) More difficult: differentiate

(a) $7x + \cos(x^n)$

(b) $e^{\sqrt{\cos x}}$.

(c) (Final 2012) $e^{(\sin x)^2}$