Math Test 1 Review

$y = \sin^{-1} x$

$\cancel{x = \sin y}$

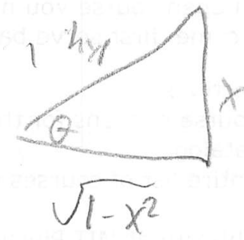
$\log_a b = x$

$a^x = b$

$\sin y = x$

$\cos y \cdot y' = 1$

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



$\frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx}(a^x) = \lim_{h \to 0} \frac{a^{x+h} - a^h}{h}$

$a^x \underbrace{\frac{a^h - 1}{h}}_{e^x}$

$a^x e^x$

$$\frac{f(x+h)-f(x)}{h}$$

$$\frac{\frac{1}{x+h} - \frac{1}{x}}{h} \quad \cdot \left(\frac{1}{h}\right) \quad \frac{1}{x+h}$$

$$\frac{\frac{x-(x+h)}{x(x+h)}}{h}$$ ← get same denom

know strategies

carry →

be slow

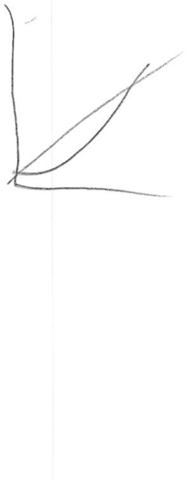
$$\frac{x-(x+h)}{x(x+h)} \cdot \frac{1}{h} \rightarrow \text{across} \quad \frac{\cancel{x-(x+h)}}{h\,x(x+h)} \quad \frac{-1}{x(x+h)}$$

$h \to 0$

$$\frac{-1}{x(x+0)} \quad \frac{-1}{x^2}$$

pt-slope form

deriv at



$\log_a b = x$

$a^x = b$

$\ln(a^b) = b\ln(a)$

x^n $\quad \lim_{h \to 0} \dfrac{(x_0+h)^n - (x)^n}{h}$ $\quad$ proof - memorize

$$\frac{(x_0+h)(x_0+h)(x_0+h) - x^n}{h}$$

↓ pascal triangle

just write through

$$x_0^n + n x_0^{n-1} \cdot h + (\cancel{*}) \, x_0^{n-2} h^2 + \dots h^n$$

$$n x_0^{n-1} h + (*) \, x_0^{n-2} h^2 + \dots + h^n$$

$$n x_0^{n-1}$$

$$\frac{1}{1-x} \qquad \frac{\frac{1}{1-(x+h)} - \frac{1}{1-x}}{h} = \frac{\frac{1}{1-x-h} - \frac{1}{1-x}}{h}$$

$$\frac{(1-x) - (1-x-h)}{(1-x)(1-x-h)} \quad \frac{\cancel{1} \cancel{-x} \cancel{-1} \cancel{+x} + h}{(1-x)(1-x-h)} \cdot \frac{1}{h}$$

close -1 accident otherwise I did it!

$$\frac{\cancel{2}}{(1-x)(1-x-0)}$$

$$\frac{\cancel{*}1}{(1-x)^2}$$

$$\frac{d}{dx} \sin x = \frac{\sin(h + x) - \sin x}{h}$$

$$\frac{\sin x \cosh + \cos x \sin x - \sin x}{h}$$

$$\frac{\sin x(\cos h + 1) + \cos x \sin x}{h}$$

split

$$\frac{\sin x(\cos h + 1)}{h} \qquad \frac{\cos x \sin x}{h}$$

$$\sin \underbrace{\frac{\cosh + 1}{h}}_{0} \qquad \cos \frac{\sin h}{\sin} \quad 1$$

Sketch + see

- squeeze theorm

$$= 0 + 1 \cos x$$

$$\frac{d}{dx} \sin x = \cos x$$

Proof

$f(x)\,g(x)$ $\qquad \lim_{h\to 0} \dfrac{f(x+h)\,g(x+h) - f(x)\,g(x)}{h}$

Clever algebra

$$\frac{f(x+h)\,g(x+h) - f(x)\,g(x+h) + f(x)\,g(x+h) - f(x)\,g(x)}{h}$$

factor $\lim_{h\to 0} g(x+h)\left(\dfrac{f(x+h) - f(x)}{h}\right) + \underbrace{f(x)\left[\dfrac{g(x+h) - g(x)}{h}\right]}_{f(x)\,g'}$

$g(x)\,f'$

Uniform
long pants
- cloth
- soft
Colored shirts
- plain