p. 575

Indeterminate Form

$\frac{0}{0}$		$\frac{\infty}{\infty}$
$0 \cdot \infty$	0^0 0*anything=0 anything⁰=1	1^∞ show =e
∞^0		$\infty - \infty$

Ex. 4 p. 571 can you follow?
let's make sure as a class
test question is to prove this

evaluate

$$\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x \qquad 1^\infty$$

$y = \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$

$\ln y = \ln \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$

$\ln y = \lim_{x\to\infty} \ln\left(1+\frac{1}{x}\right)^x$

$\ln y = \lim_{x\to\infty} x \ln\left(1+\frac{1}{x}\right)$ $\quad \infty \cdot 0$

$\ln y = \lim_{x\to\infty} \frac{\ln\left(1+\frac{1}{x}\right)}{\frac{1}{x}}$ $\quad \frac{0}{0}$ L'Hopitals

$\ln y = \lim_{x\to\infty} \frac{\ln(1+x^{-1})}{x^{-1}}$

$\ln y = \lim_{x\to\infty} \frac{\frac{1}{(1+x^{-1})} \cdot -x^{-2}}{-x^{-2}}$

$\ln y = \lim_{x\to\infty} \frac{1}{1+\frac{1}{x}}$

$\ln y = 1$

$e^1 = y$

$y = e$

Stand and Deliver

8.7

Limit Definition of e

$$\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x = \lim_{x\to\infty}\left(\frac{x+1}{x}\right)^x = e$$