Homework #14

B.A is B.S

Will Arbito

Ryan Zhao

4.4

#6

3/31/10

$$\lim_{x \to 2} \frac{x^2+x-6}{x-2} \overset{H}{=} \lim_{x \to 2} \frac{2x+1}{-2} = -\frac{5}{2}$$

The New Group

4.4 #12

$$\lim_{t\to 0} \frac{e^{3t}-1}{t} = \frac{0}{0}$$

L'hopitals Rule

$$\lim_{t\to 0} \frac{3e^{3x}}{1} = \lim_{t\to 0} 3$$

$\boxed{\text{SECTION 4.4}}$

PROB #5

C. IVARC
J. KOHLHEPP
R. D'SOUZA
S. MANCE

#5: $\lim_{x \to 1} \frac{x^2-1}{x^2-x}$

USE L'HOPITALS ∴ $\frac{2x}{2x-x} = \frac{2(1)}{2(1)-(1)} = \frac{2}{1} = \boxed{2}$

4.4

#12

TEAM: C.A.M.

$$\lim_{x \to 0} \frac{e^{3t} - 1}{t} = \frac{e^{3(0)} - 1}{0}$$

use L' HOSPITAL'S rule

$$\lim_{x \to 0} \frac{3e^{3t}}{1} = \frac{3 \cdot e^{3(0)}}{1} =$$

$$= \frac{3 \cdot e^{0}}{1}$$

$$= \frac{3(1)}{1}$$

$$= 3$$

CASANDRA LUCERO
MAYA KHOSBAYAR
Augustin Ciocotisan

FR3CH

4.4 #14. Find the limit

$$\lim_{\theta \to \pi/2} \frac{1 - \sin\theta}{\csc\theta}$$

$$\lim_{\theta \to \pi/2} \frac{1 - \sin\theta}{\csc\theta} = \lim_{\theta \to \pi/2} \frac{1 - \sin\theta}{\frac{1}{\sin\theta}}$$

$$= \frac{1 - \sin\frac{\pi}{2}}{\frac{1}{\sin\frac{\pi}{2}}}$$

$$= \frac{1 - 1}{\frac{1}{1}} = \frac{0}{1} = 0$$

* L'Hospital rule does NOT apply in this case.

Grundle Pumpkins

Pages:304 4.4(Homework 17)

16. $\lim_{x\to\infty}\frac{x+x^2}{1-2x^2}=\lim_{x\to\infty}\frac{\infty}{\infty}$

use L'Hospital's rule using differentiation

Differentiate top and bottom: $\lim_{x\to\infty}\frac{1+2x}{-2\bullet 2x}=\lim_{x\to\infty}\frac{2x}{-4x}=\cancel{-\frac{1}{2}}$ $\frac{\infty}{\infty}$

USE L'Hospital's rule.

$\lim_{x\to\infty}\frac{2}{-4}=-\frac{1}{2}$

Sam Tobia

Pablo Espichan

Tiejun Wen

S.T.P.B

#18 $\lim_{x \to \infty} \frac{\ln(\ln x)}{x} = \frac{\infty}{\infty}$

use l'hospitals rule

$\lim_{x \to \infty} \frac{1}{\ln x} \cdot \frac{d}{dx} (\ln x)$

use l'hospitals rules

$\lim_{x \to \infty} \frac{\frac{1}{\ln x} \cdot \frac{1}{x}}{1} = \frac{1}{\infty} \cdot \frac{1}{\infty} = 0$

VOTE! 

Mena Avila
Kristian
Jalisha Crews

Science Buddies

#20

$$\lim_{x\to 1} \frac{\ln x}{\sin \pi x}$$

Use L' HOSPITAL'S Rule

$$\lim_{x\to 1} \frac{\frac{d}{dx}(\ln x)}{\frac{d}{dx}(\sin \pi x)}$$

$$\lim_{x\to 1} \frac{\frac{1}{x}}{\cos \pi x \cdot \pi} = \frac{\frac{1}{1}}{\cos \pi (1) \cdot \pi}$$

$$= \frac{1}{-1 \cdot \pi} = -\frac{1}{\pi} = \text{Answer}$$

The Group

Yves Mosculo
Abraham Egger

Section 4.4 - #22

#22 $\lim_{x \to 0} \frac{e^x - 1 - x - \frac{1}{2}x^2}{x^3}$ *

$$\Downarrow$$

$\lim_{x \to 0} \frac{e^x - x - 1}{3x^2}$ *

$$\Downarrow$$

$\lim_{x \to 0} \frac{e^x - 1}{6x}$ *

$$\Downarrow$$

$\lim_{x \to 0} \frac{e^x}{6}$ *

$$\Downarrow$$

$\lim_{x \to 0} e^x = \boxed{1}$

* USED L'HOSPITAL'S RULE, because

$\lim_{x \to a} \frac{f(x)}{g(x)} = \frac{0}{0}$ so $\lim_{x \to a} \frac{f(x)}{g(x)} = \lim_{x \to a} \frac{f'(x)}{g'(x)}$

LW.V 3/31/10
Letrice
Wilgens 4.4(#26)
Viviene

$$\lim_{x\to 0} \frac{\sin x - x}{x^3} = \lim_{x\to 0} \frac{\sin(0)-0}{0} = \frac{0}{0}$$

use L'Hospitals Rule

$$\lim_{x\to 0} \frac{\sin x - x}{x^3} = \lim_{x\to 0} \frac{f'(x)}{g'(x)}$$

$$= \lim_{x\to 0} \frac{\cos x - 1}{3x^2} = \lim_{x\to 0} \frac{\cos(0)-1}{3(0)}$$

$$= \frac{1-1}{0} = \frac{0}{0}$$

use L'Hospitals Rule

$$\lim_{x\to 0} \frac{\sin x - x}{x^3} = \lim_{x\to 0} \frac{-\sin x}{6x} = \lim_{x\to 0} \frac{-\sin(0)}{6(0)}$$

$$= \frac{0}{0}$$

use L'Hospitals Rule

$$\lim_{x\to 0} \frac{\sin x - x}{x^3} = \lim_{x\to 0} \frac{-\cos(x)}{6} = \lim_{x\to 0} -\frac{\cos(0)}{6}$$

$$= \lim_{x\to 0} \frac{\sin x - x}{x^3} = \frac{-1}{6}$$

Sal Jangrotar

EMPIRE

Laquan Drummer, Fabian Best

4.4 #28

Use l'Hospital's Rule

$$\lim_{x \to \infty} \frac{(\ln x)^2}{x}$$

$$\frac{\frac{d}{dx}(\ln x)^2}{\frac{d}{dx}(x)} = \frac{2(\ln x)\left(\frac{1}{x}\right)}{1}$$

$$\frac{2(\ln x)}{x}$$

x	y
1	0
10	.46
30	.226
300	.0053258

$$\lim_{x \to \infty} \frac{(\ln x)^2}{x} = 0$$

Use l'Hospital

$$\lim_{x \to \infty} \frac{\frac{2}{x}}{1} = 0$$

Team Kickass 4.4 #34

$$\lim_{x\to\infty} \frac{\sqrt{x^2+2}}{\sqrt{2x^2+1}}$$

$$\sqrt{\lim_{x\to\infty} \frac{x^2+2}{2x^2+1}}$$

$$\sqrt{\lim_{x\to\infty} \frac{x^2/x^2+2/x^2}{2x^2/x^2+1/x^2}}$$

$$\sqrt{\lim_{x\to\infty} \frac{1+0}{2+0}}$$

$$\sqrt{\frac{1}{2}}$$

Max Finn

Bianca

Stanly

Pythagorus

40 $\lim_{x \to -\infty} x^2 e^x$

$\lim_{x \to -\infty} \frac{x^2}{e^{-x}}$

Use L'Hospitals Rule

$\lim_{x \to -\infty} \frac{2}{e^{-x}} = \frac{2}{e^{\infty}} = 0$

MAT151... Team: α 3/31/10

4.4) #49

49.) $\lim_{x\to\infty} (\sqrt{x^2+x} - x)$

$$\lim_{x\to\infty} (\sqrt{x^2+x} - x)\frac{(\sqrt{x^2+x}+x)}{(\sqrt{x^2+x}+x)} = \frac{\cancel{x^2}+x+\cancel{x\sqrt{x^2+x}}-\cancel{x\sqrt{x^2+x}}-\cancel{x^2}}{(\sqrt{x^2+x}+x)}$$

$$= \frac{x}{(\sqrt{x^2+x}+x)}$$

★ use L.H

$$\lim_{x\to\infty} \frac{1}{\frac{1}{2}(x^2+x)^{(-1/2)}(2x+1)+1} = \frac{1}{\left[\frac{2x+1}{\frac{1}{2}\sqrt{x^2+x}}\right]+1}$$

$$\left[\Rightarrow \lim_{x\to\infty} \frac{2\sqrt{(x^2/x^2)+(x/x^2)}}{\frac{2\cancel{x}}{\cancel{x}}+\frac{1}{x}} = \frac{\infty}{\infty} \quad ★ \text{ use } \lim_{x\to\infty} \quad = 1 \right]$$

$$\frac{1}{1+1} = \frac{1}{2}$$

$$\boxed{\text{ans: } \lim_{x\to\infty}(\sqrt{x^2+x} - x) = \frac{1}{2}}$$

Jonathan Chen

Mike Gankhuyag

59

Team Diesel

Stanley ~~Tuckler~~, Connor Payne, Tyler Forst 3/31/10

$$\lim_{x \to \infty} x^{1/x} \qquad e^{\ln(\lim_{x \to \infty} x^{1/x})} = e^{\lim_{x \to \infty} \ln x^{1/x}}$$

$$= e^{\lim_{x \to \infty} \frac{\ln x}{x}} = \frac{\infty}{\infty}$$

$$e^{\lim_{x \to \infty} \frac{1/x}{1}} = e^{\frac{1/1}{1}} = e^{1}$$