Chapter 3 – L'hopital's Rule WKST Name: KEY

NO CALCULATOR!

For problems #1-3, evaluate the "basic" limits by using L'hopital's Rule.

1. $\lim_{x\to 2} \frac{8-x^3}{2x^2+5x-18}$ $\frac{0}{0}$

$\lim_{x\to 2} \frac{-3x^2}{4x+5}$

$= \frac{-3(2)^2}{4(2)+5}$

$= \frac{-12}{13}$

2. $\lim_{x\to 3} \frac{x^3-3x^2-4x+12}{x-3}$

$\lim_{x\to 3} \frac{3x^2-6x-4}{1}$

$= 3(3)^2-6(3)-4$

$= 5$

3. $\lim_{t\to 9} \frac{\sqrt{t}-3}{t-9}$

$\lim_{t\to 9} \frac{\frac{1}{2}t^{-\frac{1}{2}}}{1}$

$= \frac{1}{2}(9)^{-\frac{1}{2}}$

$= \frac{1}{2}\cdot\frac{1}{3} = \frac{1}{6}$

For problems #4-7, evaluate the AP Questions by using L'hopital's Rule.

4 $\lim_{h\to 0} \frac{(h+5)^6-5^6}{h}$

$= \lim_{h\to 0} \frac{6(h+5)^5-0}{1}$

$6(5)^5$

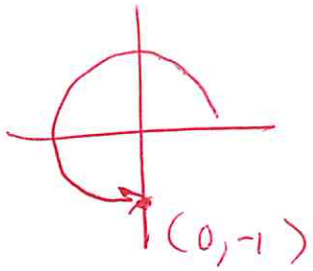
(A) 0 (B) 5^6 (C) $(7)5^6$ (D) 5^5 (E) $(6)5^5$

5. $\lim_{h\to 0} \frac{\cos\left(\frac{3\pi}{2}+h\right)-\cos\left(\frac{3\pi}{2}\right)}{h}$

$\lim_{h\to 0} \frac{-\sin\left(\frac{3\pi}{2}+h\right)-0}{1}$

$= -\sin\left(\frac{3\pi}{2}\right)$

$= -1(-1)$



(A) 1 (B) $\frac{\sqrt{2}}{2}$ (C) 0 (D) -1 (E) undefined

6. $\lim_{x\to 1} \frac{x-1}{\ln x}$ is

$$\lim_{x\to 1} \frac{1}{\frac{1}{x}}$$

$$= \frac{1}{\frac{1}{1}} = 1$$

(A) 0 (B) $\frac{1}{e}$ (C) 1 (D) e (E) nonexistent

7. If $a \neq 0$, then $\lim_{x\to a} \frac{x^3 - a^3}{x^4 - a^4}$ is

$$\lim_{x\to a} \frac{3x^2}{4x^3}$$

$$= \frac{3a^2}{4a^3} = \frac{3}{4a}$$

(A) $\frac{3}{4a}$ (B) $\frac{3}{4a^2}$ (C) $\frac{3}{2a}$ (D) $\frac{3}{2a^2}$ (E) nonexistent

ANSWERS:

1) -12/13
2) 5
3) 1/6
4) E
5) A
6) C
7) A