PRACTICE ITEMS FOR EXAM I

1. _____ FOR THE LIMIT $\lim_{x\to 2}(-6x-1)=-13$ WHEN CONSTRUCTING A DELTA-EPSILON PROOF ACORDING TO THE METHOD DEMONSTRATED IN CLASS, WHAT WOULD BE THE CHOICE FOR DELTA?

A. CHOOSE $\delta=\frac{\varepsilon}{|-13|}$ B. CHOOSE $\delta=\frac{\varepsilon}{-6}$ C. CHOOSE $\delta=\frac{\varepsilon}{|-6|}$ D. CHOOSE $\delta=\frac{\varepsilon}{|2|}$

E. NONE OF THESE

2. _____ HOW MANY (NOT "WHAT ARE THEY", SIMPLY "HOW MANY") DISCONTINUITIES DOES THE FUNCTION $f(x)=\begin{cases}2x-7 & if\ x\le 5\\ \frac{-8}{x-7} & if\ x>5\end{cases}$ HAVE ON THE INTERVAL $(-\infty,\infty)$?

A. 0 B. 1 C. 3 D. 4 E. NONE OF THESE

3. _____ GIVEN $\lim_{x\to 5} f(x)=8$. BASED ON THAT ALONE, WHICH OF THE FOLLOWING **MUST** BE TRUE?

A. ALL OF B, C, AND D MUST B E TRUE B. $f(x)$ IS CONTINUOUS AT $x=5$

C. $f(x)$ IS DISCONTINUOUS AT $x=5$ D. $\lim_{x\to 5^-} f(x)=8$ E. NONE OF THESE

4. _____ GIVEN $\lim_{x\to 2} f(x)=7$. BASED ON THAT ALONE, WHICH OF THE FOLLOWING **MUST** BE TRUE?

A. ALL OF THESE MUST BE TRUE B. $\lim_{x\to 2^+} f(x)=7$ C. $f(x)$ IS CONTINUOUS AT $x=2$

D. $f(x)$ IS DISCONTINUOUS AT $x=2$ E. NONE OF THESE

5. _____ THE WHEN CONSTRUCTING A DELTA-EPSILON PROOF, THE METHOD DEMONSTRATED IN THE VIDEO LESSONS HAS THREE STEPS. WHAT IS THE SECOND OF THOSE STEPS?

A. VERIFY δ B. LET $\varepsilon>0$ C. SEARCH FOR δ D. NOT ENOUGH INFORMATION IS GIVEN
E. NONE OF THESE

6. _____ EVALUATING WHICH OF THE FOLLOWING LIMITS WILL <u>REQUIRE</u> MORE WORK THAN "SUBSTITUTE AND SIMPLIFY"?

A. ALL OF THESE B. $\lim_{x\to\pi}\tan(x)=$ C. $\lim_{x\to 3}\frac{\left(x^2-9\right)}{\left(x+3\right)}=$ D. $\lim_{x\to 2}\frac{\left(x-2\right)}{\left(x^2-4\right)}=$ E. NONE OF THESE

7. _____ FOR THE FUNCTION $f(x)=\begin{cases}5-x & if\ x<4\\ 2x-5 & if\ x\ge 4\end{cases}$ WHAT IS THE VALUE OF $\lim_{x\to 4^+} f(x)=$?

A. THE LIMIT DOES NOT EXIST B. 1 C. 3 D. NOT ENOUGH INFORMATION IS GIVEN
E. NONE OF THESE

8. _____ WHAT ARE THE X – VALUES WHERE THE FUNCTION $f(x)$ IS **DISCONTINUOUS** IF

$$f(x)=\begin{cases}2-\frac{16}{(x-6)^2} & if\ x\le 4\\ 2x+\frac{10}{(x-5)} & if\ x>4\end{cases}\ ?$$

A. $x=4$ & $x=5$ & $x=6$ B. $x=4$ & $x=5$ C. $x=4$ & $x=6$

D. $x=5$ & $x=6$ E. NONE OF THESE

9. _____ WHAT ARE THE x – VALUES WHERE THE FUNCTION $f(x)=\sec(x)-\tan(x)$ IS DISCONTINUOUS?

A. ALL x – VALUES SUCH THAT $x=(2k+1)\cdot\pi$ B. ALL x – VALUES SUCH THAT $x=2k\cdot\pi$

C. ALL x – VALUES SUCH THAT $x=(2k+1)\cdot\pi/2$ D. NOT ENOUGH INFORMATION IS GIVEN

E. NONE OF THESE

10. _____ GIVEN $f(x)$ IS CONTINUOUS AT $x=-3$. BASED ON THAT ALONE, WHICH OF THE FOLLOWING **MUST** BE TRUE?

A. ALL OF B, C, AND D MUST B E TRUE B. $f(x)$ IS DEFINED AT $x=-3$

C. $\lim_{x\to(-3)} f(x)$ EXISTS D. $\lim_{x\to(-3)} f(x)=f(-3)$ E. NONE OF THESE

11. _____ WHEN CONSTRUCTING A DELTA-EPSILON PROOF OF THE LIMIT $\lim_{x\to(-6)}(2x+9)=-3$ ACCORDING TO THE METHOD DEMONSTRATED IN THE VIDEO LESSONS, WHICH LINE IN THE PROOF INDICATES THE REQUIREMENT THAT $x\neq-6$?

A. CHOOSE $\delta=\dfrac{\varepsilon}{|-6|}$ B. $0<|x-a|<\delta$ C. $|f(x)-L|<\varepsilon$

D. THERE IS NO SUCH INDICATION IN THE PROOF E. NONE OF THESE

12. _____ FOR THE FUNCTION $f(x)=\begin{cases}1+2x-\tan(2x) & \text{if } x<\pi/2\\ 2x-\cos(2x) & \text{if } x\geq\pi/2\end{cases}$ WHAT IS THE VALUE OF $\lim_{x\to\pi/2} f(x)=$?

A. THE LIMIT DOES NOT EXIST B. 1 C. π D. NOT ENOUGH INFORMATION IS GIVEN
E. NONE OF THESE

13. _____ GIVEN THAT $f(7)$ DOES NOT EXIST, WHAT MUST ALSO BE TRUE?

A. ALL OF B, C, AND D MUST BE TRUE B. $\lim_{x\to7^+} f(x)$ DOES NOT EXIST

C. $\lim_{x\to7^-} f(x)$ DOES NOT EXIST D. $\lim_{x\to7} f(x)$ DOES NOT EXIST E. NONE OF THESE

14. _____ WHAT IS THE VALUE OF $\lim_{x\to10}\dfrac{\sqrt{x+15}-4}{x-9}$

A. 0 B. -1 C. 1 D. THE LIMIT DOES NOT EXIST E. NONE OF THESE

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II. FREE RESPONSE:

20. FIND ALL THE x-VALUES WHERE THE FUNCTION

$$f(x)=\begin{cases}\dfrac{-3}{x^2-4}, & x\leq1\\ 3-x^2 & x>1\end{cases}$$ IS <u>NOT</u> CONTINUOUS ON THE INTERVAL $(-\infty,\infty)$

21. DETERMINE THE VALUE OF k WHICH WILL MAKE THE FUNCTION CONTINUOUS.

$$f(x)=\begin{cases}x^2-kx & \text{if} \quad x<-2\\ 4x+2 & \text{if} \quad x\geq-2\end{cases}$$

22. EVALUATE THE LIMIT:

$$\lim_{x\to 3}\frac{\left(\sqrt{x+1}-2\right)}{(x-3)}$$

23. FIND **ALL** THE x-VALUES WHERE THE FUNCTION

$$f(x)=\begin{cases}-\cos(x), & x\le 0\\ \tan(x), & x>0\end{cases}$$ IS <u>NOT</u> CONTINUOUS ON THE INTERVAL $\left(-2\pi,2\pi\right)$.

24. EVALUATE THE LIMIT:

$$\lim_{x\to 4}\frac{x^2-6x+8}{x^2-x-12}$$

25. EVALUATE THE LIMIT:

$$\lim_{x\to 0}\ \frac{2\tan(3x)}{x}$$

26. USE THE DEFINITION OF CONTINUITY AT A POINT TO DETERMINE IF THE GIVEN FUNCITON IS CONTINUOUS AT THE POINT $x=-1$.

$$f(x)=\begin{cases}4x-x^2, & x\le -1\\ \dfrac{15}{x+4}, & x>-1\end{cases}$$

27. USING A $\delta-\varepsilon$ PROOF, PROVE THE FOLLOWING STATEMENT.

$$\lim_{x\to(-3)}\left(-5x-6\right)=9$$