

Name Answerkey
 period #

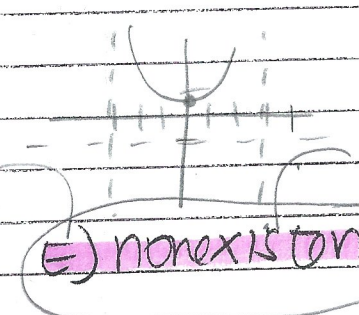
Limits/continuity Review Quiz

#1) $\lim_{x \rightarrow \infty} \frac{2 - 3x - x^2}{(x^2 - x)}$ is $-\frac{1}{6}$

- A) ∞ B) $\frac{1}{3}$ C) $-\frac{1}{6}$ D) $-\frac{1}{2}$ E) 0

#2) $\lim_{x \rightarrow 3} \frac{x^2 + 3}{9 - x^2}$ is $\frac{x^2 + 3}{(3-x)(3+x) = 0}$
 $\frac{9}{9} = -1$
 $\sqrt{x=3} \quad x=-3$

- A) -1 B) $\frac{1}{3}$ C) 1 D) 3 E) nonexistent



#3) $\lim_{x \rightarrow 2} \frac{x+2}{x^2-4}$ is $\frac{x+2}{(x+2)(x-2)} = \frac{1}{x-2}$

- A) $+\infty$ B) 0 C) $-\frac{1}{2}$ D) $-\infty$ E) nonexistent

#4) $\lim_{x \rightarrow 0} \frac{e^x - \cos(x-2x)}{x^2 - 2x} = \frac{0}{0}$ L'Hopital's rule
 $\lim_{x \rightarrow 0} \frac{e^x + \sin(x-2)}{2x-2} = \frac{1+0-2}{0-2} = \frac{-1}{-2} = \frac{1}{2}$

- A) $-\frac{1}{2}$ B) 0 C) $\frac{1}{2}$ D) 1 E) nonexistent

#5) What is $\lim_{h \rightarrow 0} \frac{\cos(\frac{3\pi}{2} + h) - \cos(\frac{3\pi}{2})}{h} = \frac{0}{0}$

- A) 1 B) $\frac{\sqrt{2}}{2}$ C) 0 D) -1 E) the limit does not exist

L'Hopital's rule

$\lim_{h \rightarrow 0} \frac{-\sin(\frac{3\pi}{2} + h) \cdot 1 - 0}{1} = -\sin(\frac{3\pi}{2}) = 1$



#6) The graph of the function f is shown, which of the following statements must be false?

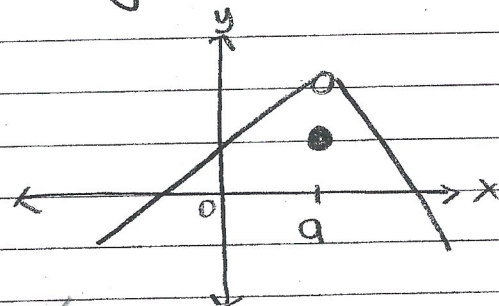
A) $f(a)$ exists ✓

B) $f(x)$ is defined for $0 < x < a$ ✓

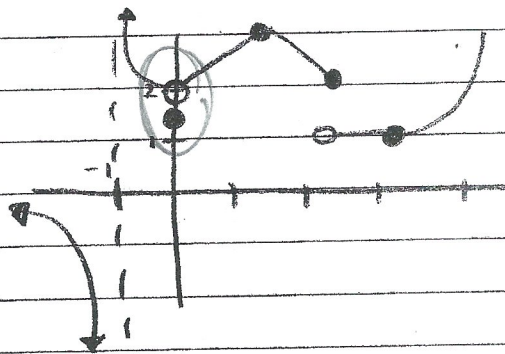
C) f is not continuous at $x = a$ ✓

D) $\lim_{x \rightarrow a} f(x)$ exists ✓

E) $\lim_{x \rightarrow a} f'(x)$ exists



#7) The graph of a function f is shown. If $\lim_{x \rightarrow b} f(x)$ exists and f is not continuous at b , then $b = 0$.



A) -1

B) 0

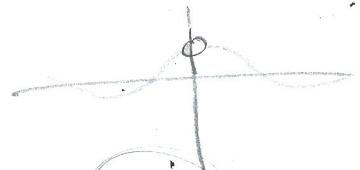
C) 1

D) 2

E) 3

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

*using a calc.



#8) consider the function $f(x) = \begin{cases} \frac{\sin x}{x}, & x \neq 0 \\ k, & x = 0 \end{cases}$

In order for $f(x)$ to be continuous at $x=0$ the value of k must be

A) ~~0~~

D) π

B) 1

E) a number greater than 1

C) ~~1~~

#9) A function $f(x) = \frac{x^2 + 2x - 3}{x - 1}$ for all x except $x=1$.

For the function to be continuous at $x=1$, the value of $f(1)$ must be

A) 0

B) 1

C) 2

D) 3

E) 4

#10) let $f(x) = \begin{cases} \frac{x^2 - 25}{x - 5} & \text{if } x \neq 5 \\ 12 & \text{if } x = 5 \end{cases}$

Which of the following statements are true?

I. f is defined at $x=5$ ✓

III. f is continuous at $x=5$.

II. $\lim_{x \rightarrow 5} f(x)$ exists ✓

A) I only

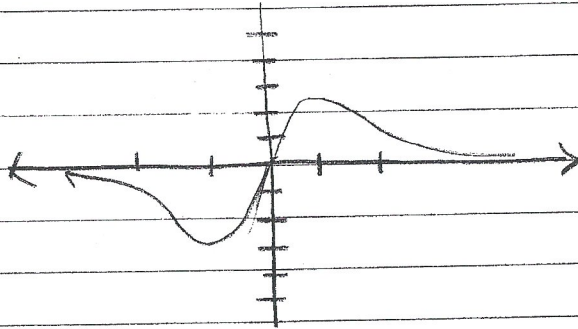
B) II only

C) I and II only

D) I, II and III only

E) none of these

#11) Which function could have the graph below?



A) $y = \frac{x}{x^2+1}$

~~B) $y = \frac{2x^2}{x^2+1}$ $\lim_{x \rightarrow \infty} = 2$~~

~~C) $y = \frac{5x}{x^2-1}$ $\lim_{x \rightarrow 1} = -1$ $\lim_{x \rightarrow -1} = 1$~~

D) $y = \frac{5x}{x^2+1}$

~~E) $y = \frac{x^2+3}{x^2+5}$ $\lim = 1$~~