Unit 1 Quiz 2 Review

Name: _____ **Date:** _____

1. $\lim_{x\to 0} \frac{\sin x \cos x}{x}$ is

$1 \cdot \cos(0) = 1 \cdot 1$

$= 1$

2. $\lim_{x\to 0} \frac{\sin 4x}{2x}$ is $= 2$

3. $\lim_{x\to 0} \frac{\sin 9x}{\sin 5x} = \frac{9}{5}$

check in calc if you don't believe me

4. $\lim_{x\to 7^-} \frac{|x-7|}{x-7} =$ -1

5. $\lim_{x\to 2^+} \frac{x|x-2|}{x-2}$ is $= 2$

6. $\lim_{x\to 4^-} \frac{2-\sqrt{x}}{\sqrt{4-x}}$ is

mult $\frac{2+\sqrt{x}}{2+\sqrt{x}}$ mult $\frac{\sqrt{4-x}}{\sqrt{4-x}}$

$\lim_{x\to 4^-} \frac{(4-x)(\sqrt{4-x})}{(4-x)(2+\sqrt{x})}$ 0

$\lim_{x\to 4^-} \frac{\sqrt{4-x}}{2+\sqrt{x}} = \frac{\sqrt{4-4}}{2+\sqrt{4}} = \frac{0}{4}$

7. Let f be defined as follows:

$$f(x) = \begin{cases} \frac{x^2-9}{x-3} & \text{for } x \neq 3, \\ 1 & \text{for } x = 3 \end{cases}$$

$\frac{(x-3)(x+3)}{x-3}$ = Hole @ $(3, 6)$

Which of the following are true about f?

I. $\lim_{x\to 3} f(x)$ exists

II. $f(3)$ exists

III. $f(x)$ is continuous at $x = 3$

8. Let f be defined as following:

$$f(x) = \begin{cases} x^2-4 & \text{for } x > 6, \\ 2ax & \text{for } x \leq 6 \end{cases}$$

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$2 \cdot 6 \cdot a = 12a$

For what value of a is the function continuous?

$36 - 4 = 12a$

$32 = 12a$

$a = \frac{32}{12} = \frac{8}{3}$

9. $f(x) = \begin{cases} x^2-45 & \text{for } x > 9, \\ a^2x & \text{for } x \leq 9 \end{cases}$

For what value(s) of a is the function continuous?

$81 - 45 = 9a^2$

$36 = 9a^2$

$\sqrt{4} = \sqrt{a^2}$

$a = \pm 2$

you put $\sqrt{}$

10. Consider $f(x) = \begin{cases} x^2+2 & \text{for } x<0, \\ 1 & \text{for } x=0, \\ x^2-2 & \text{for } x>0 \end{cases}$

a) $\lim_{x\to 0^+} f(x) =$ -2

b) $\lim_{x\to 0^-} f(x) =$ 2

c) $\lim_{x\to 2} f(x) =$ 2

d) Where is $f(x)$ discontinuous? @ 0

e) If a function is discontinuous at $x = a$, does this necessarily mean that $\lim_{x\to a}$ does not exist?

No the limit could exist but if $\lim_{x\to a} f(x) \neq f(a)$ then that makes the function discontinuous.

11. $\lim_{h\to 0} \frac{7(x+h)^2 - 7x^2}{h} =$

$\lim_{h\to 0} \frac{7(x^2+2xh+h^2) - 7x^2}{h}$

$\lim_{h\to 0} \frac{7x^2 + 14xh + 7h^2 - 7x^2}{h}$

$\lim_{h\to 0} 14x + 7h = 14x$

12. $\lim_{h\to 0} \frac{\sqrt{x+h} - \sqrt{x}}{h} = \frac{\sqrt{x+h} + \sqrt{x}}{\sqrt{x+h} + \sqrt{x}}$

$\lim_{h\to 0} \frac{x+h-x}{h(\sqrt{x+h} + \sqrt{x})}$

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

13. $\lim_{h\to 0} \frac{\frac{1}{(x+h)^2} - \frac{1}{x^2}}{h} \cdot \frac{(x+h)^2}{(x+h)^2}$

$\lim_{h\to 0} \frac{x^2 - (x+h)^2}{(x+h)^2 (x^2)} \cdot \frac{1}{h}$

$\lim_{h\to 0} \frac{x^2 - x^2 - 2xh - h^2}{(x+h)^2 x^2 h}$

$\lim_{h\to 0} \frac{-2x - h}{(x+h)^2 x^2} = \frac{-2x}{x^4} = \frac{-2}{x^3}$

14. $\lim_{x\to \frac{1}{2}} \frac{8x^3 - 1}{10x^2 - 7x + 1} =$

$\lim_{x\to \frac{1}{2}} \frac{(2x-1)(4x^2+2x+1)}{(5x-1)(2x-1)}$

$\lim_{x\to \frac{1}{2}} \frac{4(\frac{1}{4}) + 2(\frac{1}{2}) + 1}{5/2 - 1}$

$= \frac{1+1+1}{3/2} = \frac{3 \cdot 2}{3}$ 2

15. Find A so that $\lim_{x\to 2} \frac{x^2 + Ax - 10}{x-2}$ exists.

$\lim_{x\to 2} \frac{(x-2)(x+5)}{(x-2)}$

$x^2 + 3x - 10$ $A = 3$

16. If $\lim_{x\to 0} \frac{\sqrt{Ax+B} - 2}{x} = 3$, then what are the values of A and B?

$\frac{\sqrt{Ax+B} + 2}{\sqrt{Ax+B} + 2}$

$\lim_{x\to 0} \frac{Ax + B - 4}{x(\sqrt{Ax+B} + 2)}$ → to cancel x, $B = 4$

$\lim_{x\to 0} \frac{Ax}{x\sqrt{Ax+4} + 2}$

$\frac{A}{\sqrt{A(0)+4} + 2} = 3$

$\frac{A}{\sqrt{4}+2} = 3$

$\frac{A}{4} = 3$ $A = 12$

Unit 1 Quiz 2 Review 9/5/2019

1.
Answer: 1
Points: 1

2.
Answer: 2
Points: 1

3.
Answer: $\frac{9}{5}$
Points: 1

4.
Answer: -1
Points: 1

5.
Answer: 2
Points: 1

6.
Answer: 0
Points: 1

7.
Answer: I and II only
Points: 1

8.
Answer: 3
Points: 1

9.
Answer: ± 2
Points: 1

10.
Answer: -2, 2, 2, at 0, no
Points: 1

11.
Answer: $14x$
Points: 1

12.
Answer: $\frac{1}{2\sqrt{x}}$
Points: 1

13.
Answer: $-\frac{2}{x^3}$
Points: 1

14.
Answer: 2
Points: 1

15.
Answer: 3
Points: 1

16.
Answer: $A = 12, B = 4$
Points: 1