

Unit 1 Quiz 2 Review

Name: _____

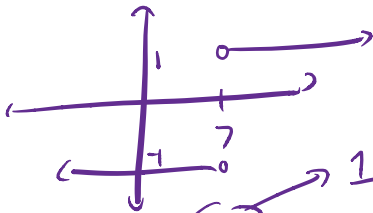
Date: _____

1. $\lim_{x \rightarrow 0} \frac{\sin x \cos x}{x}$ is
 $1 \cdot \cos(0) = 1 \cdot 1$
 $= 1$

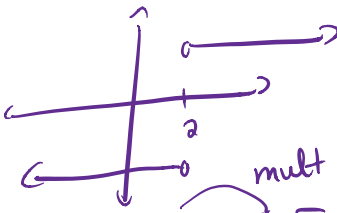
2. $\lim_{x \rightarrow 0} \frac{\sin 4x}{2x}$ is $= 2$

3. $\lim_{x \rightarrow 0} \frac{\sin 9x}{\sin 5x} = \frac{9}{5}$
 check in calc if you don't believe me

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



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



6. $\lim_{x \rightarrow 4^-} \frac{2-\sqrt{x}}{\sqrt{4-x}}$ is 0
 $\lim_{x \rightarrow 4^-} \frac{(4-x)(\sqrt{4-x})}{(4-x)(2+\sqrt{x})} = 0$

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

7. Let f be defined as follows:

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

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

Which of the following are true about f ?

- I. $\lim_{x \rightarrow 3} f(x)$ exists
- II. $f(3)$ exists
- III. $f(x)$ is continuous at $x=3$

8. Let f be defined as following:

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

$36 - 4 = 12a$

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 $\sqrt{\quad}$

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) $\lim_{x \rightarrow 0^+} f(x) = \underline{-2}$

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

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

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

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

No the limit could exist but if $\lim_{x \rightarrow a} f(x) \neq f(a)$

then that makes the function discontinuous.

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

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

$\lim_{h \rightarrow 0} \frac{14xh + 7h^2}{h}$

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

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

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

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

13. $\lim_{h \rightarrow 0} \frac{x^a \frac{1}{(x+h)^2} - \frac{1}{x^2}}{h} = \frac{(x+h)^a}{(x+h)^a}$

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

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

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

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

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

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

$= \frac{1 + 1 + 1}{\frac{5}{2} - 1} = \underline{\frac{3}{3/2} = 2}$

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

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

$x^2 + 3x - 10$

A=3

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

$\lim_{x \rightarrow 0} \frac{Ax+B-4}{x(\sqrt{Ax+B}+2)}$ **To cancel x**

B=4

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

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

$\frac{A}{\sqrt{4}+2} = 3$
A=12

Unit 1 Quiz 2 Review 9/5/2019

- | | |
|---|---|
| 1.
Answer: 1
Points: 1 | 15.
Answer: 3
Points: 1 |
| 2.
Answer: 2
Points: 1 | 16.
Answer: $A = 12, B = 4$
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 | |