

Math 229 – Quiz 3 – Zasada

SHORT ANSWER: Write the word or phrase that best complete each statement or answers the question. Show all work. Answers with inadequate work will receive a reduced score.

1) Choose an equation from the following that expresses the fact that a function f is continuous at a number 8.

a. $\lim_{x \rightarrow 8} f(x) = -\infty$

b. $\lim_{x \rightarrow 8} f(x) = f(8)$

c. $\lim_{x \rightarrow 8} f(x) = \infty$

d. $\lim_{x \rightarrow 0} f(x) = f(8)$

e. $\lim_{x \rightarrow 0} f(x) = 8$

2) Determine where f is discontinuous.

$a = 0$

$$f(x) = \begin{cases} \sqrt{-x}, & x < 0 \\ 7 - x, & 0 \leq x < 7 \\ (7 - x)^2, & x > 7 \end{cases}$$

$f(x) = \sqrt{-x}$

$f(x) = 7 - x$

$f(a)$
 $f(0) = \sqrt{-0} = 0$

$f(a)$
 $f(0) = 7 - 0 = 7$

$\lim_{x \rightarrow 0} \sqrt{-x} = 0$

$\lim_{x \rightarrow 0} 7 - x =$

3) How would you define $f(7)$ in order to make f continuous at 7?

$$f(x) = \frac{x^2 - 4x - 21}{x - 7}$$

$$\lim_{x \rightarrow 7} \frac{x^2 - 4x - 21}{x - 7}$$

$$= \lim_{x \rightarrow 7} \frac{(x-7)(x+3)}{(x-7)}$$

$$= \lim_{x \rightarrow 7} x + 3 = 10$$

$$\boxed{f(7) = 10}$$

4) Find the numbers, if any, where the function $f(x) = \frac{x+9}{x^2-81}$ is discontinuous.

$$= \frac{\cancel{x+9}}{(x-9)(\cancel{x+9})} = \frac{1}{x-9}$$

$$\boxed{x \neq \pm 9}$$