

What is your name? Key

Period: \_\_\_\_\_

### AP Calculus AB: 2.6 Continuity of Piecewise Functions

Write whether the following functions are continuous at all points. If not then explain which rule it violates and at what x-value.

1.  $f(x) = 3x^2 + 4$

Cont

2.  $g(x) = 4x^3 - 7x$

Cont

3.  $h(x) = \frac{x^2-9}{x+3}$

hole  $x=-3$   
removable discont

4.  $f(x) = \frac{x-2}{x^4-16}$

hole  $x=2$  | VA  $x=-2$   
removable | infinity  
discont | discont

Check whether the piecewise functions below are continuous at all points. If not then explain which rule it violates and at what x-value.

5.  $f(x) = \begin{cases} -x^2 - 4, & x < 0 \\ 2x - 4, & x \geq 0 \end{cases}$

✓  $\lim_{x \rightarrow 0} f(x) = -4$

✓  $f(0) = -4$

✓  $\lim_{x \rightarrow 0} f(x) = f(0)$

continuous at  $x=0$

6.  $f(x) = \begin{cases} \frac{x-4}{x^2-16}, & x < 4 \\ \frac{2}{4x}, & x \geq 4 \end{cases}$

Continuous at  $x=4$

7.  $f(x) = \begin{cases} \frac{x^2-1}{x-1}, & x \leq 1 \\ \ln(x), & x > 1 \end{cases}$

$\lim_{x \rightarrow 1} f(x)$  DNE

so  $f(x)$  is  
not continuous

8.  $f(x) = \begin{cases} \frac{-7x}{3}, & x < -1 \\ 3^x + 2, & x > -1 \end{cases}$

Not continuous

$f(-1)$  DNE

9. Is the function  $f(x)$  continuous?  $f(x) = \begin{cases} -12, & x = -2 \\ \frac{4}{2^x}, & x \neq -2 \end{cases}$  if it is not continuous what

can you do to the function to make it continuous?

switch  $-12$  to be  $16$  and it would  
be continuous