AP Calculus AB
Continuity
HW 1-4

Name: _____

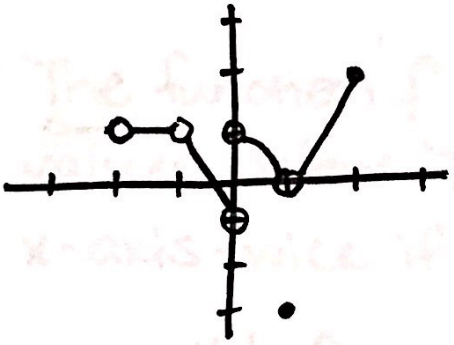
Discuss the continuity of each piecewise function.

1) $f(x)=\begin{cases} x^3, & x\le 2 \\ 4-2x, & x>2 \end{cases}$

2) $f(x)=\begin{cases} \frac{9}{x^2}, & x\le -3 \\ 4+x, & x>-3 \end{cases}$

3) $f(x)=\begin{cases} \frac{1}{2-3x}, & x\le -3 \\ \sqrt[3]{x+2}, & x>-3 \end{cases}$

4) Use the function graph to answer the questions about $g(x)$.



a) Does $g(1)$ exist?

b) Does $\lim_{x\to 1} g(x)$ exist?

c) Does $\lim_{x\to 1} g(x)=g(1)$?

d) Is g continuous at $x=1$?

e) Is g defined at $x=-1$?

f) Is g continuous at $x=-1$?

g) For what values of x is g continuous?

5) Find the value of a that makes the function continuous.

a) $f(x)=\begin{cases} x^2-1, & x<3 \\ 2ax, & x\ge 3 \end{cases}$

b) $f(x)=\begin{cases} 2x+3, & x\le 2 \\ ax+1, & x>2 \end{cases}$

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

d) $f(x) = \begin{cases} \dfrac{\sqrt{2x+5} - \sqrt{x+7}}{x-2}, & x \neq 2 \\ a+3, & x = 2 \end{cases}$

6) Without graphing, explain why the function $f(x) = x^2 - 4x + 3$ has a zero in the interval $[2,4]$ using the Intermediate Value Theorem.

7) The function f is continuous on $[0,2]$ and has the values below. The equation must pass through the x-axis twice if k equals what?

x	0	1	2
$f(x)$	1	k	2

8) a) Evaluate the limit.

$$\lim_{x \to 0} \frac{\frac{1}{x+3} - \frac{1}{3}}{x}$$

b) Evaluate the limit.

$$\lim_{x \to -3} \frac{x^2 + 2x - 3}{x^2 - 2x - 15}$$