AP Calculus AB - Worksheet 13 **Continuity**

Strive for continuous improvement, instead of perfection. – Kim Collins

3-Part Definition of Continuity

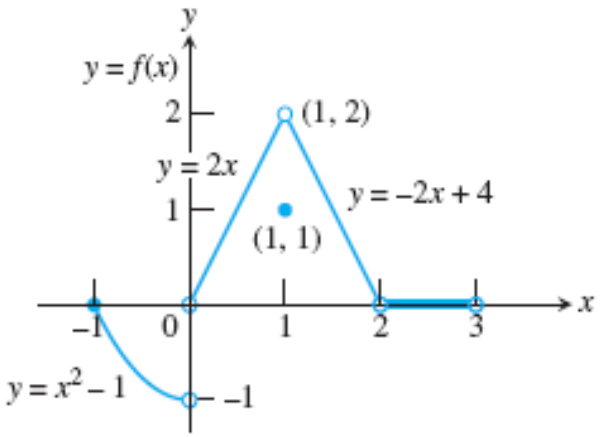
Show (THREE STEPS) that each of the following functions is either continuous or discontinuous at the given value of x.

1. $f(x)=x+5$ at $x=1$	2. $f(x)=x^2+2x-1$ at $x=0$
3. $f(x)=\dfrac{x^2-16}{x-4}$ at $x=4$	4. $f(x)=\dfrac{x^2-25}{x+5}$ at $x=5$
5. $f(x)=\dfrac{1}{x}$ at $x=3$	6. $f(x)=\dfrac{3x-1}{2x+6}$ at $x=-3$

State the open interval(s) on which each function is continuous.

7. $f(x)=x^2+2$	8. $f(x)=\dfrac{1}{x}$
9. $f(x)=\dfrac{x^2+1}{x-1}$	10. $f(x)=\lvert x-1\rvert$

$$f(x)=\begin{cases} x^2-1, & -1\le x<0 \\ 2x, & 0<x<1 \\ 1, & x=1 \\ -2x+4, & 1<x<2 \\ 0, & 2<x<3 \end{cases}$$



11. Given $f(x)$ and the graph of $f(x)$, state why continuity fails at each value of x.
    a) $x=0$
    b) $x=1$
    c) $x=2$

12. State the interval(s) on which $f(x)$ is continuous.