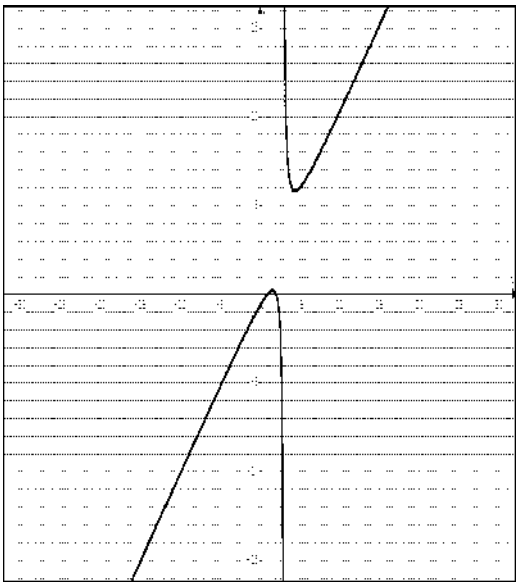
Continuity **Name**_____

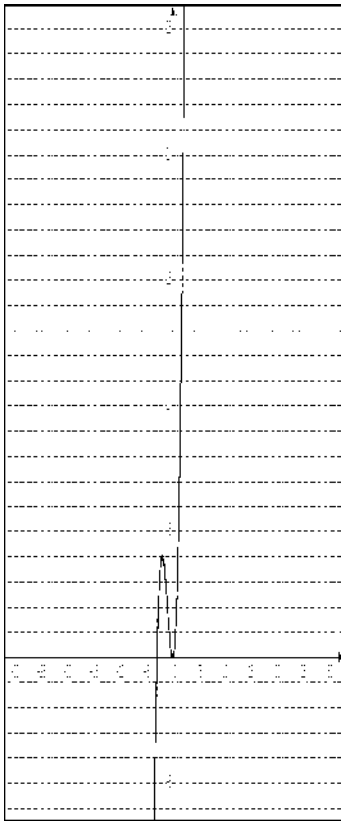
AP Calculus

Recall from last year that functions can be continuous OR they can be discontinuous at certain x-values. Look at the examples below. All three functions have a point at which they are not continuous. Find the x-values where the function is not continuous and state the type of discontinuity.

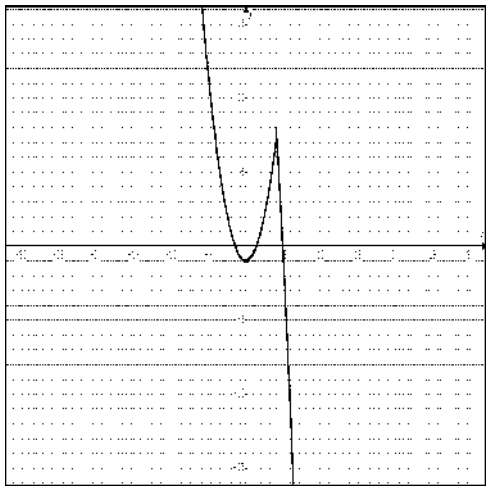
1) $f(x) = \dfrac{x^2 - 3x + 2}{x - 3}$



2) $g(x) = \dfrac{x^4 + x^3 - 6x^2}{x - 2}$



3) $h(x) = \begin{cases} \frac{1}{2}x^2 - 1 & (x < 4) \\ -x^2 + 24 & (x \geq 4) \end{cases}$



Determine algebraically whether the following functions are continuous. If not, explain why and indicate any points where the functions are NOT continuous.

4) $f(x)=\dfrac{x^2+2x}{x}$

5) $f(x)=\dfrac{x^2+2x}{x^2+5x+6}$

6) $f(x)=\begin{cases}3x^2-20 & (x\le 3)\\ x+5 & (x>3)\end{cases}$

7) $f(x)=\begin{cases}x+7 & (x\ne -1)\\ 6 & (x=-1)\end{cases}$

8) $f(x)=\begin{cases}\dfrac{10}{x-3} & (x<2)\\ x-12 & (x\ge 2)\end{cases}$

9) $f(x)=\begin{cases}x-12 & (x<2)\\ \dfrac{10}{x-3} & (x\ge 2)\end{cases}$

10) $f(x)=\dfrac{x^2+2x}{2}$

11) $f(x)=\dfrac{x^5-8x^3+x^2+6}{x-1}$

12) What value of c makes f(x) a continuous function?

$$f(x)=\begin{cases}\dfrac{x^2-5x-14}{x+2} & (x\ne -2)\\ c & (x=-2)\end{cases}$$

13) Fill in domains for the piecewise function so that the function is continuous.

$$f(x)=\begin{cases}3x-16, & x\_\_\_\_\_\\ -5x, & x\_\_\_\_\_\end{cases}$$