

### Answer on Question #47634 – Math - Calculus

Give the interval where each of the functions is continuous. Explain your answers.

a.  $g(x) = (\sqrt{x + 1}) / (x^2 - 9)$

b.  $h(x) = \ln(x^2 - 1)$

c.  $h(x) = x^2 + 1$  if  $x < -1$

$= x^2 + 2x + 3$  if  $-1 \leq x \leq 0$

$= 1 - (1/x)$  if  $x > 0$

#### Solution.

A function  $f(x)$  is continuous when, for every value  $c$  in its domain:

$f(c)$  is defined, and  $\lim_{x \rightarrow c} f(x) = f(c)$ .

a.  $g(x) = \frac{\sqrt{x+1}}{x^2-9}$

$g(x)$  is continuous for  $x \in [-1, 3) \cup (3, \infty)$ .

b.  $h(x) = \ln(x^2 - 1)$

$h(x)$  is continuous for  $x \in (-\infty, -1) \cup (1, \infty)$ .

c.  $h(x) = \begin{cases} x^2 + 1, & \text{if } x < -1 \\ x^2 + 2x + 3 & \text{if } -1 \leq x \leq 0 \\ 1 - \frac{1}{x} & \text{if } x > 0 \end{cases}$

$h(x)$  is continuous for  $x \in (-\infty, 0) \cup (0, \infty)$ .