

1. Let $f(x) = \frac{(x+2)^2}{x^2-4}$. Find the following:

a. $\lim_{x \rightarrow 0} f(x) = \lim_{x \rightarrow 0} \frac{(x+2)^2}{x^2-4} = \frac{(0+2)^2}{0^2-4} = \frac{2^2}{-4} = \frac{4}{-4} = \boxed{-1}$

b. $f(0) = -1$

Is f continuous at $x = 0$? Yes.

c. $\lim_{x \rightarrow -2} f(x) = \lim_{x \rightarrow -2} \frac{(x+2)^2}{(x+2)(x-2)} = \lim_{x \rightarrow -2} \frac{x+2}{x-2} = \frac{-2+2}{-2-2} = \frac{0}{-4} = \boxed{0}$

2. Determine where the function is continuous. State the type of each discontinuity (removable (hole), asymptote, jump).

$$f(x) = \frac{x-1}{x^2+3x-4}$$

f is not continuous when $x^2+3x-4=0$
 $(x+4)(x-1)=0$
 $x=-4 \quad x=1$

so f is is continuous when $\boxed{\begin{array}{l} x \neq -4 : \text{asymptote} \\ x \neq 1 : \text{hole} \end{array}}$