

Name: _____

Continuity

1) State whether or not the following functions are continuous at $x = 1$

1) $f(x) = 2x^3 - 4x + 5$

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

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

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

5) $f(x) = \begin{cases} \frac{x^3-1}{x-1} & \text{for } x \neq 1 \\ 3 & \text{for } x=1 \end{cases}$

2) The given function has a removable discontinuity at a certain point. How should the function be defined in order to make it continuous everywhere?

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

2) $f(x) = \frac{x-4}{\sqrt{x}-2}$

3) $f(x) = \frac{4x^2-9}{2x-3}$

4) $f(x) = \frac{1-x}{\sqrt{x}-1}$

5) $f(x) = \frac{x^2-1}{x-1}$

3) Given the function f defined by:

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

1. For what values of x is $f(x)$ discontinuous?
2. At each point of discontinuity found in part (a), determine whether $f(x)$ has a limit and, if so, give the value of the limit.
3. Write an equation for each vertical and horizontal asymptote. Justify your answer.