

## Lesson 5 Worksheet

August 30, 2017

Find the point(s) where  $f(x)$  is discontinuous and classify each discontinuity as a hole, jump, or vertical asymptote.

1.  $f(x) = \frac{x+1}{x-1}$

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

3.  $f(x) = \begin{cases} x^2 & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } 0 < x < 1 \\ x & \text{if } x \geq 1 \end{cases}$  (Hint: Try sketching the graph.)

4.  $f(x) = \begin{cases} \frac{x}{x^2 - 2x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases}$

5.  $f(x) = \begin{cases} \frac{x}{x^2 - 2x} & \text{if } x \neq 0 \\ -1/2 & \text{if } x = 0 \end{cases}$

Answers:

1. vertical asymptote at  $x = 1$
2. hole at  $x = 0$  and vertical asymptote at  $x = 1/2$
3. there are no discontinuities
4. hole at  $x = 0$  and vertical asymptote at  $x = 1$
5. vertical asymptote at  $x = 1$