The Continuity Review is a single-session extended activity targeting the following student learning objectives:

- students can differentiate between the concept of a limit and of continuity,

- students can identify and use the definition of continuity to verify continuity of functions, and

- students can provide examples of discontinuous functions and explain in words why these functions have discontinuities.

The Review consists of two activities primed by an initial discussion of function continuity. The instructor should begin by polling the class and writing the definition on the board before transitioning to the first activity.

The first activity has the students devise examples of discontinuities. The instructor should divide the students into groups of 3. The instructor can also assign one student from each group the role of spokesperson during the classroom debrief segment. Within each group, the students are assigned a type of discontinuity and are tasked with generating the algebraic equation of a function, draw its graph, and provide a short explanation of why the generated function is an example of the assigned discontinuity. Students are then to share their examples to their group and make and adjustments if necessary. The groups are then to report back to the classroom their findings. The instructor should have a groups share their example of a specified type to the classroom on the board.
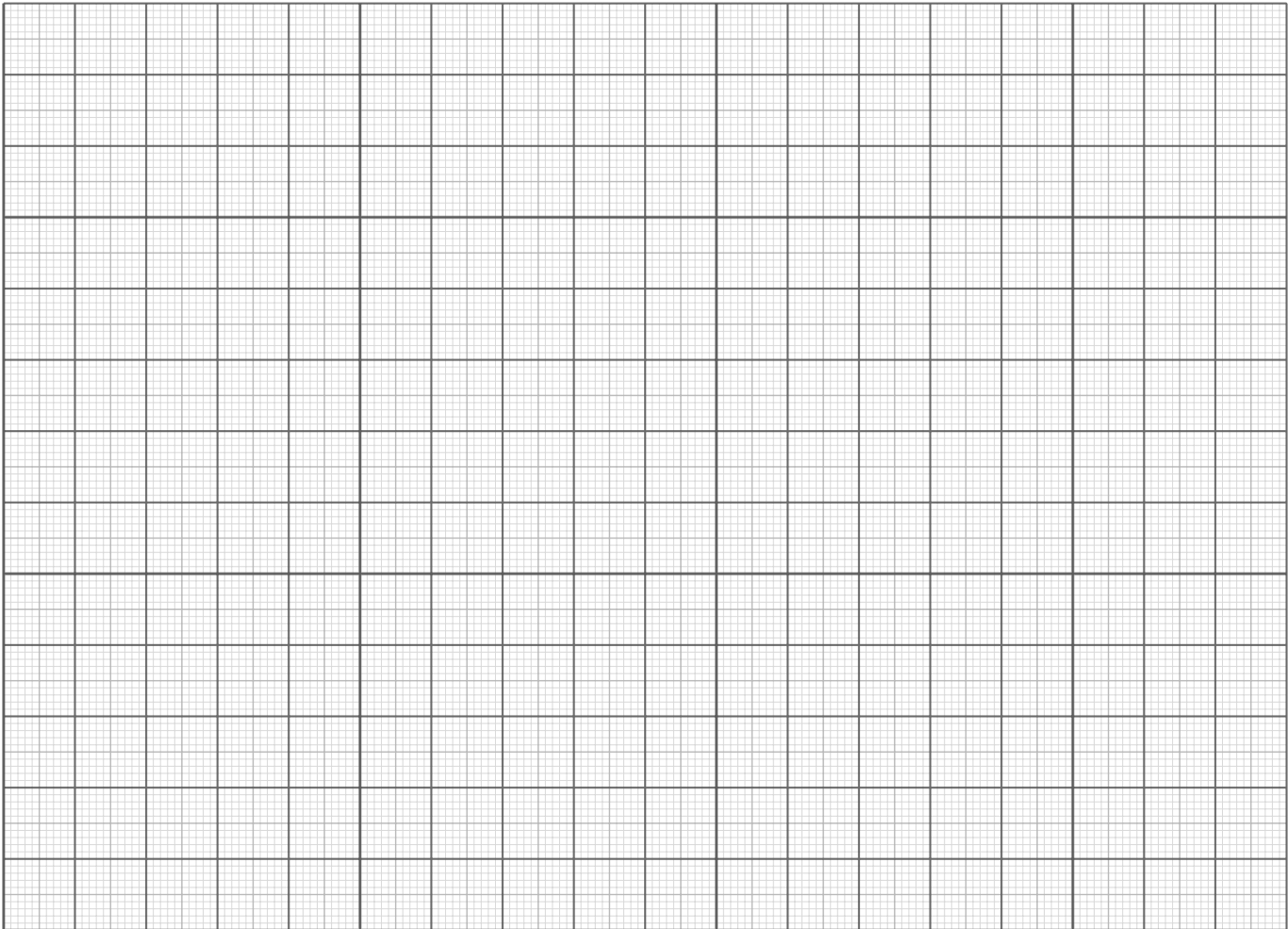
The second activity has the students group the eight functions on the tear-away slip on the fourth page of their handout. The students are free to group the functions however they would like on the slip, which are anonymously collected by the instructor and placed into a receptacle. The instructor randomly pulls a slip from the receptacle and replicates the grouping on the board for the classroom. The instructor then encourages the students to sleuth the reasoning behind the grouping of the function. The instructor is encouraged to fill the remainder of the session by continuing this process of drawing a new slip and discussing the grouping with the class.

- **Priming the Session** (5 min):

  - The instructor asks the class to define continuity at a point.

  - The instructor writes the definition on the board.

- **Examples of Discontinuous Functions** (30-40 min):

  - Students are divided into groups of 3.

  - Students are assigned different types of discontinuity and are to individually generate examples. (5-10 minutes)

  - Students share their examples to their groups. (5-10 min)

  - Groups report an example to the classroom. (10-15 min)

- **Function Grouping** (10+ min):

  - Students submit groupings of the 8 functions on their handout.

  - The instructor draws groupings and leads a discussion on how the groupings were made.

Type of Discontinuity:

Generate a function $f(x)$ that exhibits the type of discontinuity above. Draw its graph below and write a short explanation why the function exhibits the required discontinuity.

$f(x) =$

$a(x) = 2\cos(x^2) + 1$	$b(x) = \dfrac{x^2 + 3x - 5}{x - 1}$
$c(x) = x^3 - x + 1$	$d(x) = \begin{cases} 1, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$
$e(x) = \dfrac{x^2 - 1}{x + 1}$	$f(x) = \sin\left(\dfrac{1}{x}\right)$
$g(x) = \dfrac{e^x}{x - 1}$	$h(x) = \dfrac{|x|}{x}$

Write your grouping here!