Continuity and Differentiability
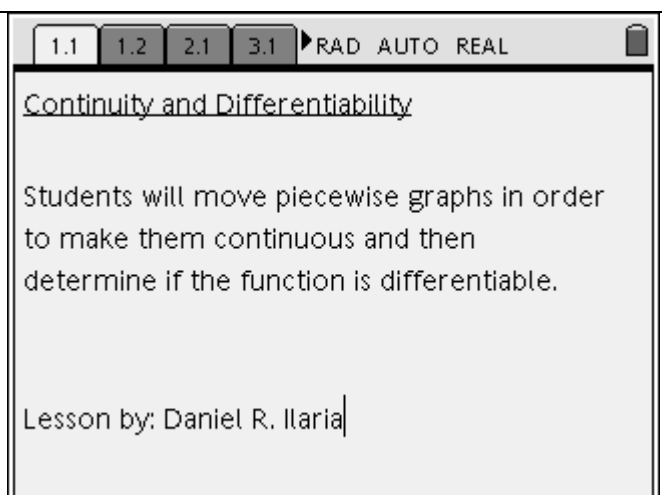# Lesson Plan for TI-Nspire™

Subject: Calculus   Lesson Time: 40 minutes
Topic: Continuity, Differentiability
File: Calculus_ContandDiff_Ilaria

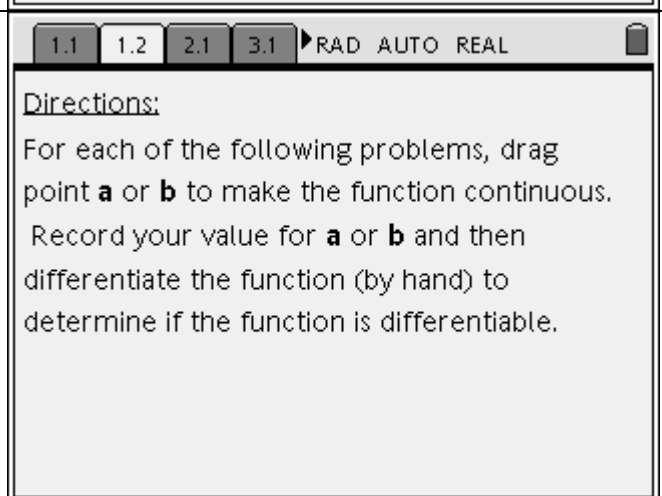|	
1) Students will move piecewise graphs in order to make them continuous. Students will complete a worksheet that discusses continuity and differentiability of each function in the file.	**1.1 1.2 2.1 3.1 ▶RAD AUTO REAL** Continuity and Differentiability Students will move piecewise graphs in order to make them continuous and then determine if the function is differentiable. Lesson by: Daniel R. Ilaria
2) Directions for students to follow. Each graph is shown below.	**1.1 1.2 2.1 3.1 ▶RAD AUTO REAL** Directions: For each of the following problems, drag point **a** or **b** to make the function continuous. Record your value for **a** or **b** and then differentiate the function (by hand) to determine if the function is differentiable.

Screen 1 (tabs 1.1 1.2 2.1 3.1) RAD AUTO REAL

5.08
1
−6.35   0.5   a   6.35   x
$a = 2.5$
$$f1(x) = \begin{cases} a \cdot x, & x > -1 \\ -x, & x < -1 \end{cases}$$
−5.78

Screen 2 (tabs 1.1 1.2 2.1 3.1) RAD AUTO REAL

$a = 4.5$ 7.72
$$f1(x) = \begin{cases} a \cdot x, & x > 1 \\ -x^2, & x < 1 \end{cases}$$
2
−5.79   0.5   a   5.79   x
−8.79

Screen 3 (tabs 1.2 2.1 3.1 4.1) RAD AUTO REAL

$a = 4.5$ 7.72
$$f1(x) = \begin{cases} (x-a)^2, & x > 0 \\ -2x^2, & x < 0 \end{cases}$$
2
−6.47   0.5   a   6.47   x
−8.79

Screen 4 (tabs 2.1 3.1 4.1 5.1) RAD AUTO REAL

$a = -2$
$b = -4$ 10.23
$$f1(x) = \begin{cases} a \cdot x^2 - 2, & x > 1 \\ -4x^2 + b, & x < 1 \end{cases}$$
2
−4.39   a   0.5   4.39   x
b
−11.65

Screen 5 (tabs 3.1 4.1 5.1 6.1) RAD AUTO REAL

3.37 $f1(x) = \begin{cases} a \cdot x^3 + 1, & x \geq 1 \\ -x^3 + b, & x < -1 \end{cases}$
0.5
−4.74   a   0.5   4.74   x
$a = -3$
$b = -2.5$ −3.84
b

Screen 6 (tabs 4.1 5.1 6.1 7.1) RAD AUTO REAL

$a = 3.5$ 7.72
$$f1(x) = \begin{cases} a \cdot x + 2, & x > 0 \\ -2x^2, & x < 0 \end{cases}$$
2
−5.64   0.5   a   5.64   x
−8.79