

- Back to Contents
- Back to Calendar

Last Name, First Name	Discussion Section	Student ID

Worksheet 2 • Working with Piecewise Defined Functions

1. Suppose that

$$f(x) = \begin{cases} -2x + 1 & \text{if } x < 0 \\ 3x + 2 & \text{if } x \geq 0 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} x + 4 & \text{if } x < 2 \\ 2 & \text{if } x \geq 2. \end{cases}$$

What are the domains of f and g ? What are the partitions for the domains of f and g with respect to which f and g are originally defined?

2. Find a refinement of the partition for f that is also a refinement of the partition for g and that has as few intervals as possible. Describe f and g as piecewise functions with this common refinement. This common refinement is a commensurable partition for f and g .

3. Find all x with

$$f(x) = g(x).$$

Find all x with

$$f(x) < g(x).$$

4. The piecewise defined function h is defined by

$$h(x) = \begin{cases} x + 5 & \text{if } x < 2 \\ 10 - x & \text{if } x \geq 2. \end{cases}$$

Find all x such that

$$h(x) < 0.$$

Find all x such that

$$h(x) \geq 0.$$

5. Find a partition for h that refines the partition given by the following two sets: the set of all x with $h(x) < 0$ and the set of all x with $h(x) \geq 0$.

6. For the function h above, write the function F given by

$$F(x) = |h(x)|$$

as a piecewise defined function.

7. Why might you need to write F as a piecewise defined function? Find all solutions to

$$F(x) = |2x - 5|.$$

- [Back to Contents](#)
 - [Back to Calendar](#)
-

8. Suppose now that

$$f(x) = \begin{cases} x^2 - 3 & \text{if } x < -1 \\ 3x + 1 & \text{if } x \geq 3 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} 10 - x & \text{if } x < -2 \\ 2x - 8 & \text{if } x \geq 1. \end{cases}.$$

Write $f \circ g$ as a piecewise defined function. Hint: The g is playing the role of your function h above and the f is playing the role of the absolute value. Note: these functions f and g have nothing to do with the f and g defined earlier.