

1. Take

$$f(x) = \begin{cases} -x & \text{if } -3 < x \leq 1 \\ x^2 - 1 & \text{if } 1 < x \leq 3 \\ x - 7 & \text{if } 3 < x \leq 7. \end{cases}$$

Evaluate  $f$  at  $x = -3$ ,  $x = 0$ ,  $x = 1$ ,  $x = 3$ ,  $x = 5$ ,  $x = 8$ .

2. Take  $f$  as before. Determine the domain of  $f$ . Use a sketch of the function  $f$  to determine the range of  $f$ .

3. Take

$$A = \{(-3, 0], (0, 3], (3, 7]\} \quad \text{and} \quad B = \{(-4, 1], (1, 2], (2, 8]\}.$$

Find a common refinement for  $A$  and  $B$ .

4. Take

$$f(x) = \begin{cases} -x & \text{if } -3 < x \leq 1 \\ x^2 - 1 & \text{if } 1 < x \leq 3 \\ x - 7 & \text{if } 3 < x \leq 7 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} 2x - 1 & \text{if } -4 < x \leq 1 \\ -3x + 9 & \text{if } 1 < x \leq 8. \end{cases}$$

Determine  $\mathcal{D}(f + g)$ ,  $\mathcal{D}(fg)$ , and  $\mathcal{D}\left(\frac{f}{g}\right)$ .

5. Take

$$f(x) = \begin{cases} -x & \text{if } -3 < x \leq 1 \\ x^2 - 1 & \text{if } 1 < x \leq 3 \\ x - 7 & \text{if } 3 < x \leq 7 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} 2x - 1 & \text{if } -4 < x \leq 1 \\ -3x + 9 & \text{if } 1 < x \leq 8. \end{cases}$$

Compute  $f + g$ ,  $fg$ , and  $\frac{f}{g}$ .

6. Take

$$f(x) = \begin{cases} 2x - 1 & \text{if } x \leq 1 \\ -3x + 9 & \text{if } x > 1. \end{cases}$$

Sketch on a number line the solution set to the inequality  $f(x) > 0$ .

7. Take

$$f(x) = \begin{cases} 2x - 1 & \text{if } x \leq 1 \\ -3x + 9 & \text{if } x > 1 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} -1.5 & \text{if } x \leq -1 \\ 3x - 9 & \text{if } x > -1. \end{cases}$$

Sketch on a number line the solution set to the inequality  $f(x) > g(x)$ .

8. Sketch on a number line the solution set to the inequality

$$|x - 2| > |3x + 1|.$$