

## Questions

**Note:** In Section 2.3 we will learn a significantly better way to sketch graphs than using a table of ordered pairs, which involves *graphical transformations*. Using a table of ordered pairs you can miss important features of the function.

1. Make a table listing some ordered pairs for the function  $f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ -\sqrt{x} & \text{if } x \geq 0 \end{cases}$

Then, sketch the graph and state the domain and range, and identify any intervals in which  $f$  is increasing, decreasing, or constant.

2. Make a table listing some ordered pairs for the function  $f(x) = \begin{cases} 8 + 2x & \text{if } x \leq -2 \\ x^3 & \text{if } -2 < x < 2 \\ 8 - 2x & \text{if } x \geq 2 \end{cases}$

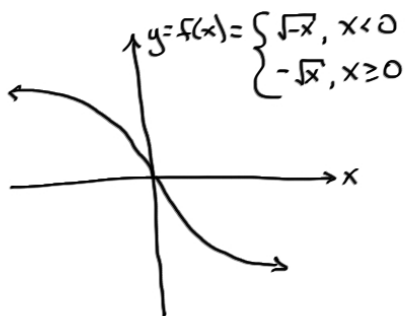
Then, sketch the graph and state the domain and range, and identify any intervals in which  $f$  is increasing, decreasing, or constant.

**Solutions**

1. Make a table listing some ordered pairs for the function  $f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ -\sqrt{x} & \text{if } x \geq 0 \end{cases}$

Then, sketch the graph and state the domain and range, and identify any intervals in which  $f$  is increasing, decreasing, or constant.

| x   | y=f(x) |
|-----|--------|
| -10 | 3.16   |
| -8  | 2.82   |
| -6  | 2.45   |
| -4  | 2      |
| -2  | 1.41   |
| 0   | 0      |
| 2   | -1.41  |
| 4   | -2     |
| 6   | -2.45  |
| 8   | -2.82  |
| 10  | -3.16  |



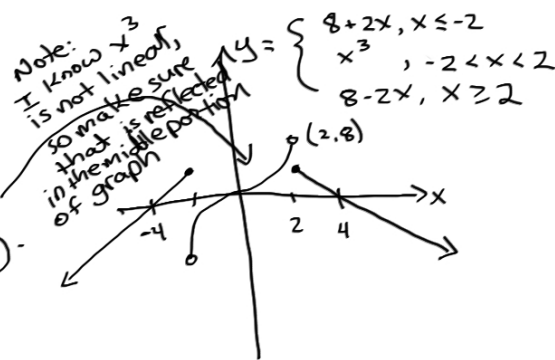
domain:  $x \in \mathbb{R}$   
 range:  $y \in \mathbb{R}$   
 decreasing  $x \in (-\infty, \infty)$ .

Note: this function appears to be continuous.

2. Make a table listing some ordered pairs for the function  $f(x) = \begin{cases} 8 + 2x & \text{if } x \leq -2 \\ x^3 & \text{if } -2 < x < 2 \\ 8 - 2x & \text{if } x \geq 2 \end{cases}$

Then, sketch the graph and state the domain and range, and identify any intervals in which  $f$  is increasing, decreasing, or constant.

| x   | y=f(x) |
|-----|--------|
| -10 | -12    |
| -8  | -8     |
| -6  | -4     |
| -4  | 0      |
| -2  | 4      |
| -1  | -1     |
| 0   | 0      |
| 1   | 1      |
| 2   | 4      |
| 4   | 0      |
| 6   | -4     |
| 8   | -8     |
| 10  | -12    |



domain:  $x \in \mathbb{R}$   
 range:  $y \in (-\infty, 8)$   
 increasing  $x \in (-\infty, -2)$   
 and  $(-2, 2)$   
 decreasing  $x \in (2, \infty)$

Note this function is not continuous!