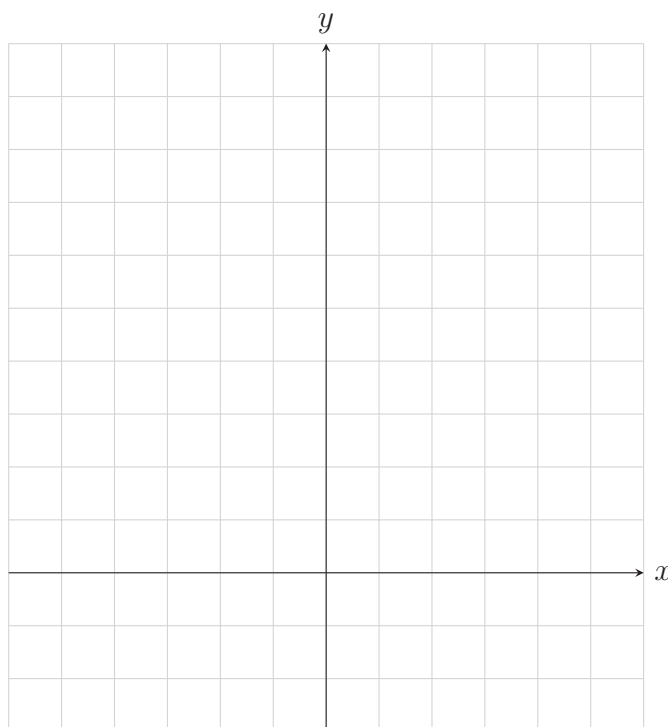


Name: \_\_\_\_\_

1. A function  $f$  defined as

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

a. Graph  $y = f(x)$ .



b. Find  $f(-2)$ ,  $f(1)$ , and  $f(2)$ .

d. Determine the domain and range of  $f$ .

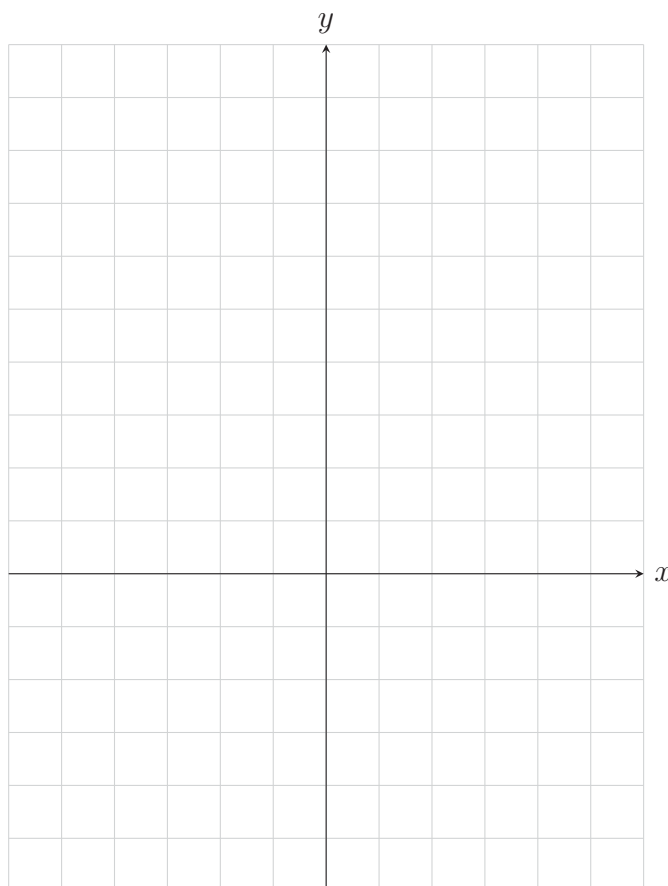
c. Locate any intercepts.

e. Is  $f$  continuous on its domain?

2. A function  $f$  defined as

$$f(x) = \begin{cases} -3x & \text{if } x < -1 \\ 0 & \text{if } x = -1 \\ -\sqrt{x-1} + 1 & \text{if } x > 1 \end{cases}$$

a. Graph  $y = f(x)$ .



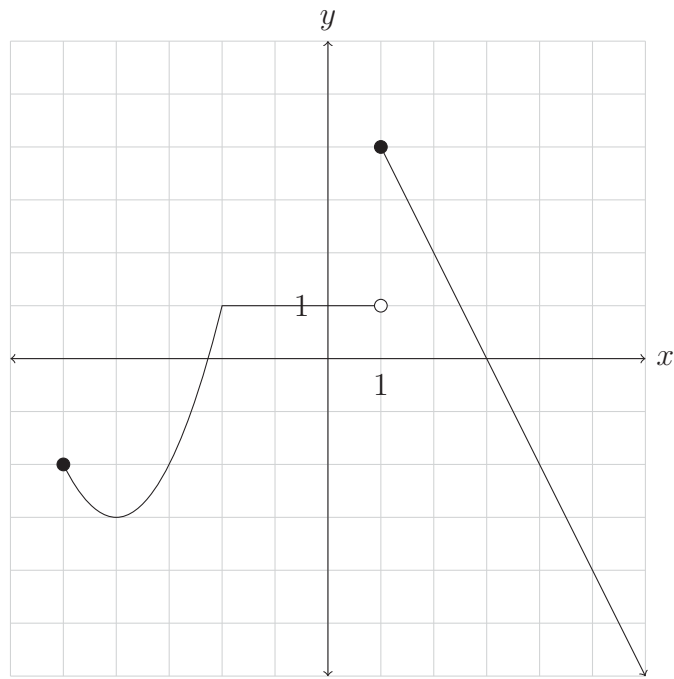
b. Find  $f(-2)$ ,  $f(-1)$ , and  $f(0)$ .

d. Determine the domain and range of  $f$ .

c. Locate any intercepts.

e. Is  $f$  continuous on its domain?

3. The graph of a piecewise-defined function is given. Write a definition for the function.



4. In the summer of 2009, Duke Energy supplied electricity to residences of Ohio for a monthly customer charge of \$4.50 plus 4.2345 cents per kilowatt-hour (kWhr) for the first 1000 kWhr supplied in the month and 5.3622 cents per kWhr for all usage over 1000 kWhr in the month.

- a. What is the charge for using 300 kWhr in a month?      b. What is the charge for using 1500 kWhr in a month?

c. If  $C$  is the monthly charge for  $x$  kWhr, develop a model relating the monthly charge and kilowatt-hours used. That is, express  $C$  as a function of  $x$ . Begin by graphing  $C = C(x)$ .

