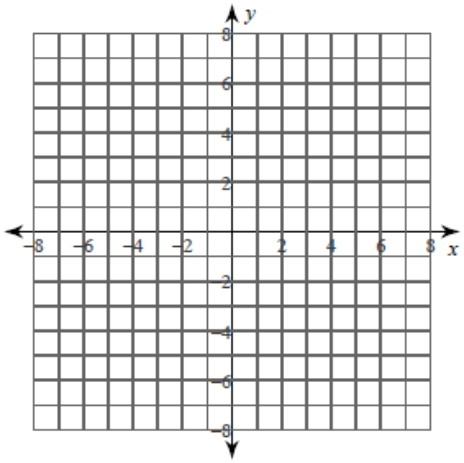
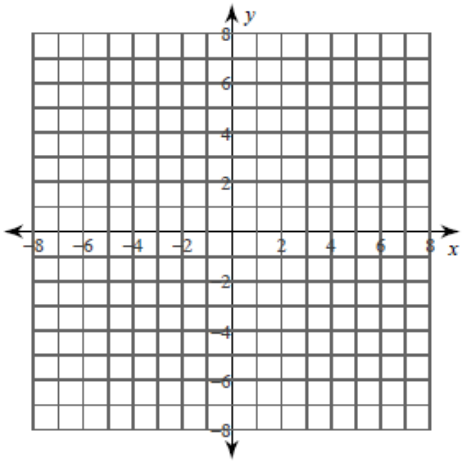
Piecewise Functions

Sketch the graph of each function.

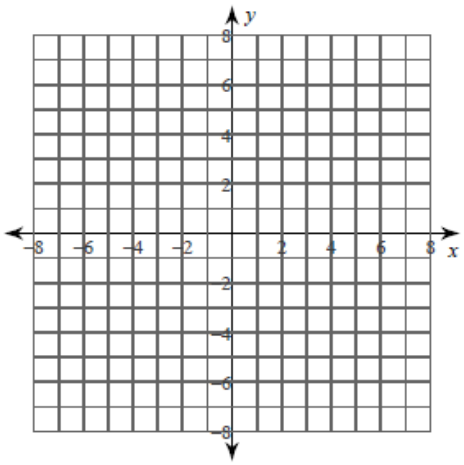
1) $f(x) = \begin{cases} -2x - 1, & x \le 2 \\ -x + 4, & x > 2 \end{cases}$



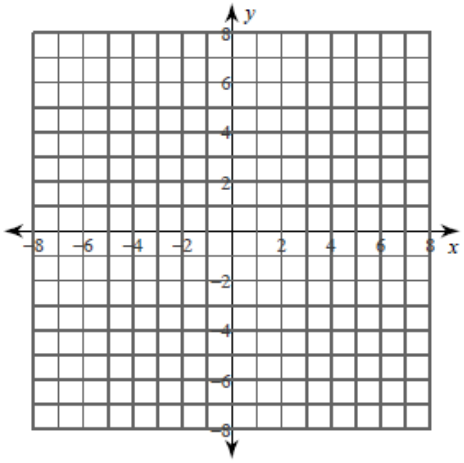
2) $f(x) = \begin{cases} -4, & x \le -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \ge 2 \end{cases}$



3) $f(x) = \begin{cases} -2^x, & x < -4 \\ -|x|, & -4 \le x \le 0 \\ 4 - x^2, & x > 0 \end{cases}$



4) $g(x) = \begin{cases} -6, & x < -2 \\ (x+1)^4, & x \ge -2 \end{cases}$

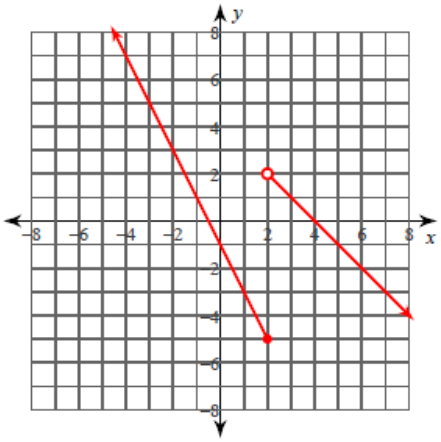


Piecewise-Defined Functions … Set 2

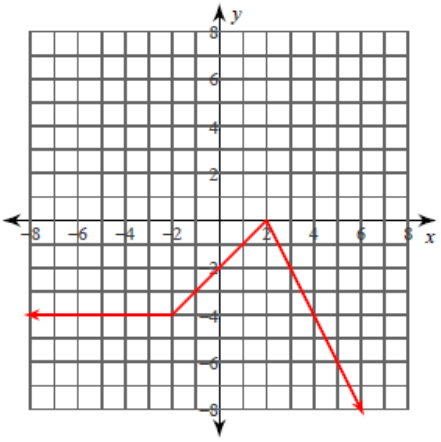
Answers

Sketch the graph of each function.

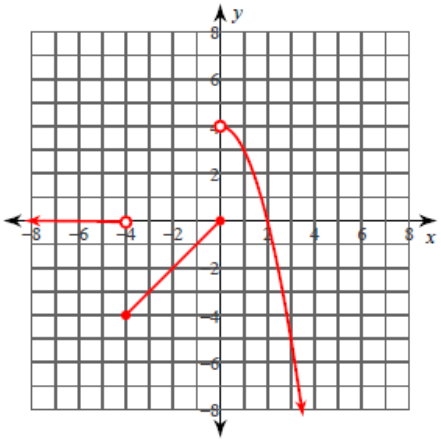
1) $f(x) = \begin{cases} -2x - 1, & x \le 2 \\ -x + 4, & x > 2 \end{cases}$



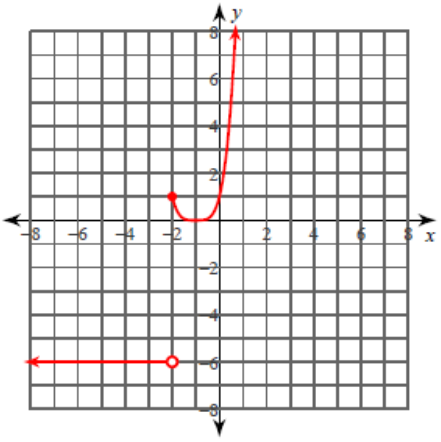
2) $f(x) = \begin{cases} -4, & x \le -2 \\ x - 2, & -2 < x < 2 \\ -2x + 4, & x \ge 2 \end{cases}$



3) $f(x) = \begin{cases} -2^x, & x < -4 \\ -|x|, & -4 \le x \le 0 \\ 4 - x^2, & x > 0 \end{cases}$

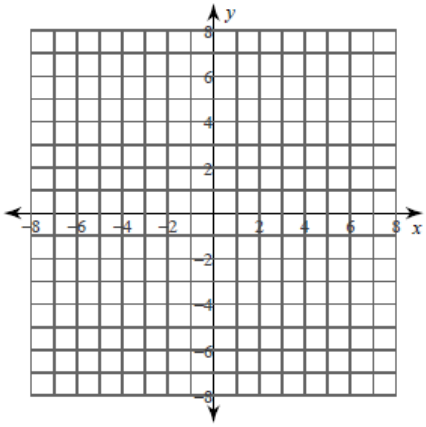


4) $g(x) = \begin{cases} -6, & x < -2 \\ (x+1)^4, & x \ge -2 \end{cases}$

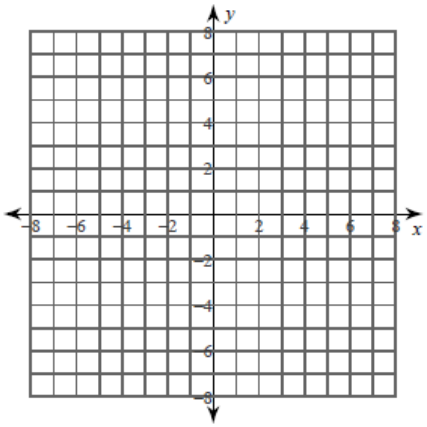


Piecewise-Defined Functions … Set 2

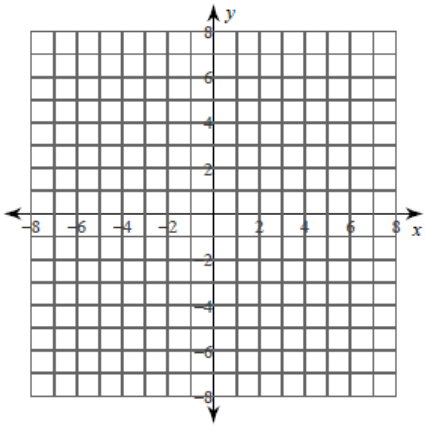
5) $f(x) = \begin{cases} \dfrac{1}{x-4}, & x \le 4 \\ -4, & x > 4 \end{cases}$



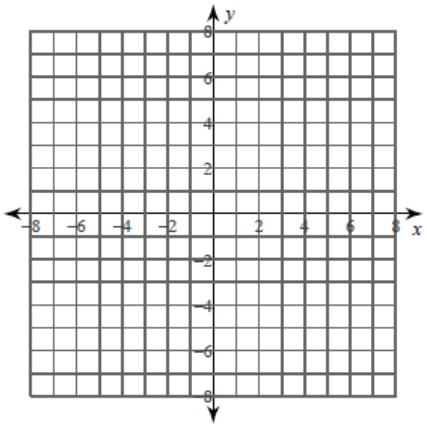
6) $h(x) = \begin{cases} 2^x, & x < -3 \\ \dfrac{3}{x}, & x \ge -3 \end{cases}$



7) $w(x) = \begin{cases} \dfrac{|x|}{2}, & x \le -4 \\ \sqrt{-x}, & -4 < x < 2 \\ |x-2|, & x \ge 2 \end{cases}$



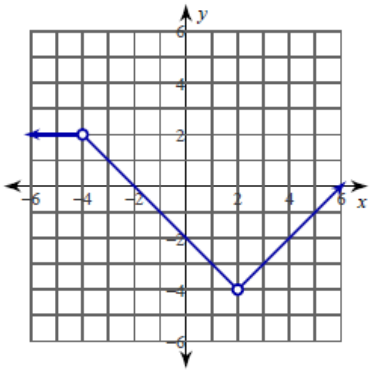
8) $w(x) = \begin{cases} |x-3|, & x < 1 \\ (x-1)^4, & x = 1 \\ \sqrt{4x}, & x > 1 \end{cases}$



Critical thinking questions:

9) Write a rule for the sign function $s(n)$: $s(n)$ is -1 when n is negative, $+1$ when n is positive, and 0 otherwise.

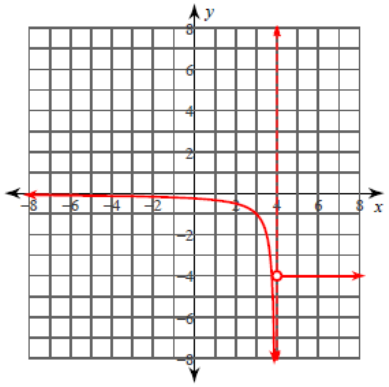
10) Write a rule for the function shown.



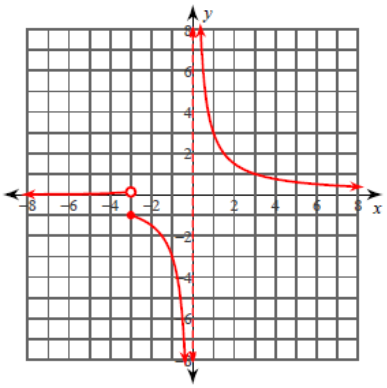
Piecewise-Defined Functions … Set 2

Answers

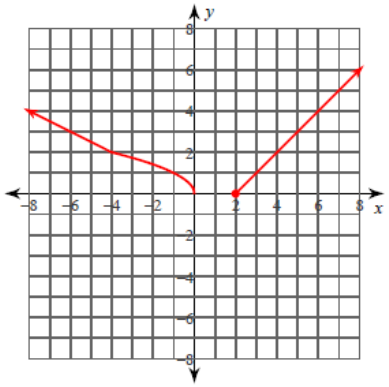
5) $f(x) = \begin{cases} \dfrac{1}{x-4}, & x \le 4 \\ -4, & x > 4 \end{cases}$



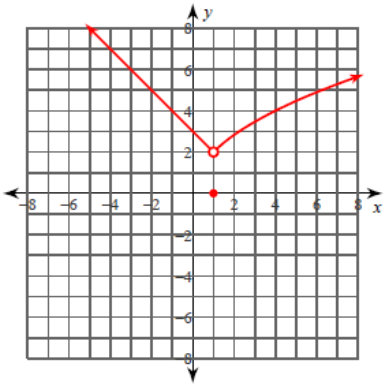
6) $h(x) = \begin{cases} 2^x, & x < -3 \\ \dfrac{3}{x}, & x \ge -3 \end{cases}$



7) $w(x) = \begin{cases} \dfrac{|x|}{2}, & x \le -4 \\ \sqrt{-x}, & -4 < x < 2 \\ |x-2|, & x \ge 2 \end{cases}$



8) $w(x) = \begin{cases} |x-3|, & x < 1 \\ (x-1)^4, & x = 1 \\ \sqrt{4x}, & x > 1 \end{cases}$

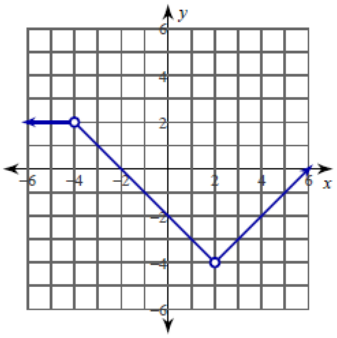


Critical thinking questions:

9) Write a rule for the sign function $s(n)$: $s(n)$ is -1 when n is negative, $+1$ when n is positive, and 0 otherwise.

$$s(n) = \begin{cases} -1, & n < 0 \\ 0, & n = 0 \\ 1, & n > 0 \end{cases}$$

10) Write a rule for the function shown.



$$f(x) = \begin{cases} 2, & x < -4 \\ -x-2, & -4 < x < 2 \\ x-6, & x > 2 \end{cases}$$