

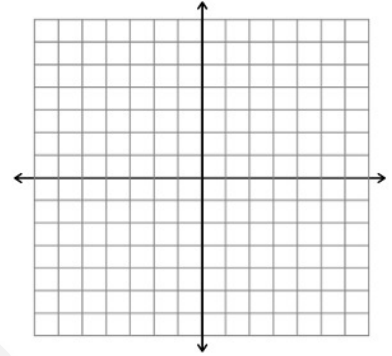
SATPREP

Assignment : Piecewise Functions

Example 1. Consider the function

$$f(x) = \begin{cases} x + 4 & , \text{ if } -6 \leq x \leq -3 \\ 4 - \frac{1}{3}x & , \text{ if } -3 < x \leq 6 \end{cases}$$

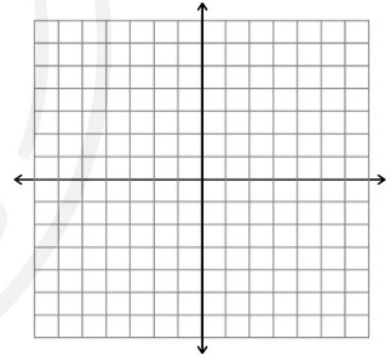
1. What is the domain of f ?
2. Find: $f(-6) = \underline{\hspace{2cm}}$; $f(0) = \underline{\hspace{2cm}}$;
3. Find: $f(3) = \underline{\hspace{2cm}}$; $f(6) = \underline{\hspace{2cm}}$
4. What is happening at the transition point?
5. Find the intercepts of f .



Example 2. Consider the function

$$g(x) = \begin{cases} \frac{1}{2}x + 1 & \text{if } x < 2 \\ 3x - 4 & \text{if } x \geq 2 \end{cases}$$

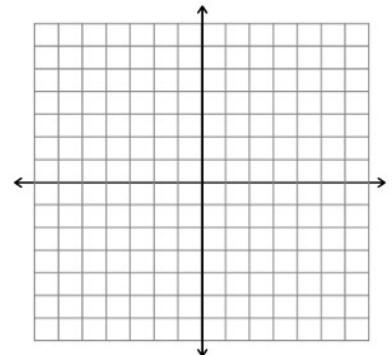
1. What is the domain of f ?
2. Sketch the graph of g .
3. What is happening at the transition point?
4. Find the intercepts of f .



Practice. Consider the function

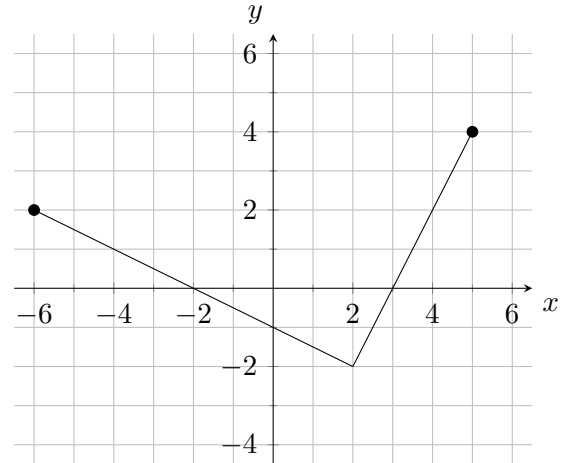
$$f(x) = \begin{cases} \frac{1}{2}x + 2 & \text{if } -5 \leq x < 0 \\ 2 & \text{if } 0 \leq x \leq 3 \\ 4 - x & \text{if } 3 < x \leq 6 \end{cases}$$

1. What is the domain of f ?
2. Sketch the graph of f .
3. What is happening at the transition point?
4. Find the intercepts of f .

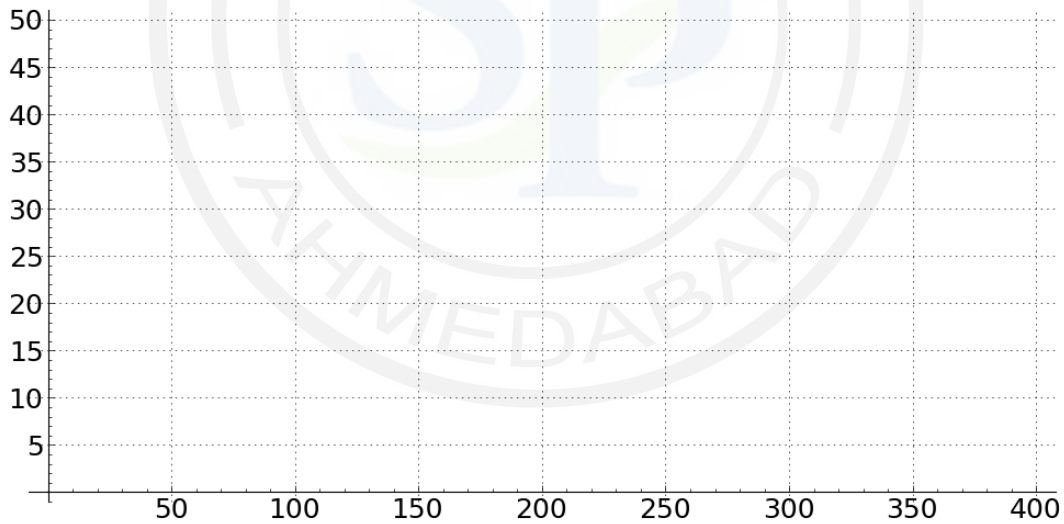


Example 3. Find a piecewise definition of the function f whose graph appears below:

$$f(x) = \begin{cases} \underline{\hspace{2cm}} & \text{if } \underline{\hspace{1cm}} \leq x < \underline{\hspace{1cm}} \\ \underline{\hspace{2cm}} & \text{if } \underline{\hspace{1cm}} \leq x \leq \underline{\hspace{1cm}} \end{cases}$$



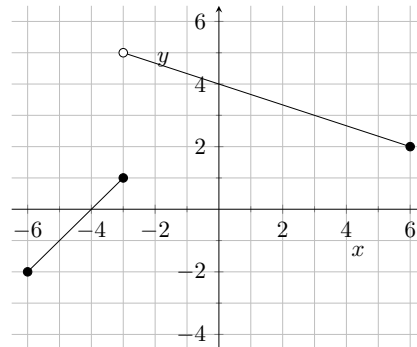
Example 4. A telephone company offers monthly cellular phone plans for \$15. It includes 200 “anytime minutes” but has a charge of \$0.25 per minute beyond 200 minutes. Draw a graph of the cost function below, and then find a piecewise definition for $C(x)$, the cost to the consumer who uses x minutes in a month.



$$C(x) = \begin{cases} \underline{\hspace{2cm}} & \text{if } \underline{\hspace{1cm}} \leq x \leq \underline{\hspace{1cm}} \\ \underline{\hspace{2cm}} & \text{if } x > \underline{\hspace{1cm}} \end{cases}$$

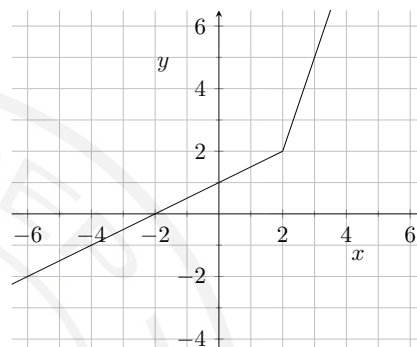
Example 1 Answers

1. The interval $[-6, 6]$
2. $f(-4) = -8$; $f(0) = 4$;
3. $f(3) = 3$; $f(6) = 2$
4. The two pieces do not “line up” at the transition $x = -3$.
5. Intercepts: $(0, 4)$, $(-4, 0)$



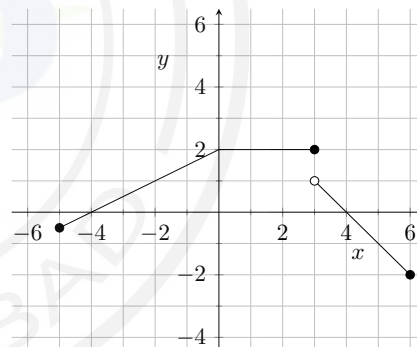
Example 2 Answers

1. The interval $(-\infty, \infty)$
2. Graph shown at right.
3. g is continuous at the transition $x = 2$
4. Intercepts $(0, 1)$ and $(-2, 0)$



Practice 1 Answers

1. The interval $[-5, 6]$
2. Graph shown at right.
3. The graph is continuous at $x = 0$ but not at $x = 3$
4. Intercepts $(0, 2)$, $(-4, 0)$, and $(4, 0)$



Example 3 Answers

$$f(x) = \begin{cases} -\frac{1}{2}x - 1 & , \text{ if } -6 \leq x < 2 \\ 2x - 6 & , \text{ if } 2 \leq x \leq 5 \end{cases}$$

Example 4 Answers

Graph is shown at the right.

$$C(x) = \begin{cases} 15 & , \text{ if } 0 \leq x \leq 200 \\ 0.25x - 35 & , \text{ if } 200 < x < \infty \end{cases}$$

