

Piecewise Functions

First & Last Name: _____ Class: _____

If you did not get full points on the *Piecewise Functions* section of the "Pre-Review" test, attempt all of the (non-challenge) questions on this handout. Check your answers using the answer key. If you did not get a correct answer, use Khan Academy to review and master the topic.

Honor Students: you are expected to master the challenge questions.

Section 1: Evaluate piecewise functions (KA link)

1. What is $g(6)$ if

$$g(x) = \begin{cases} x^2 + 5 & \text{when } x \in (-\infty, -7) \\ 8x + 17 & \text{when } x \in [-7, 3] \\ (x-1)(x+6) & \text{when } x \in (3, \infty) \end{cases}$$

Since $6 \in (3, \infty)$, $g(6) = (6-1)(6+6) = 5(12) = 60$

2. What is $f(-8)$ if

$$f(t) = \begin{cases} t^2 - 2t & , t \leq -8 \\ t + 17 & , -8 < t < -3 \\ \frac{t^3}{t+10} & , t \geq 3 \end{cases}$$

If $t = -8$, then $t \leq -8$ is True and $f(-8) = 8^2 - 2(8) = 64 - 16 = 48$

3. [Challenge] What is $h(0)$ if

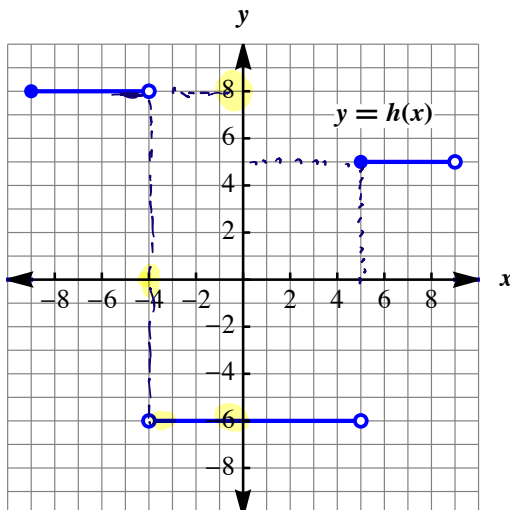
$$h(x) = \begin{cases} x^4 - \sqrt{6-x} & , x \leq -6 \\ 6-x & , -6 < x < 0 \\ x^3 & , x > 0 \end{cases}$$

Since 0 is not in the domain of the function, $h(0) = \text{Undefined}$.

Section 2: Evaluate step functions (KA link)

1. Use the graph to evaluate:

- a. $h(-4.0001) = 8$
- b. $h(-4) = \text{Undefined}$
- c. $h(-3.999) = -6$
- d. $h(5.0001) = 5$

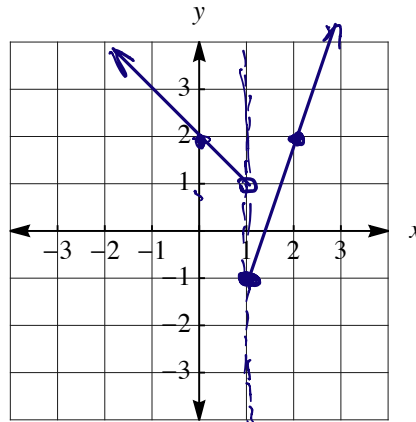


Section 3: Piecewise functions graphs (KA link)

1. Graph the piecewise function

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

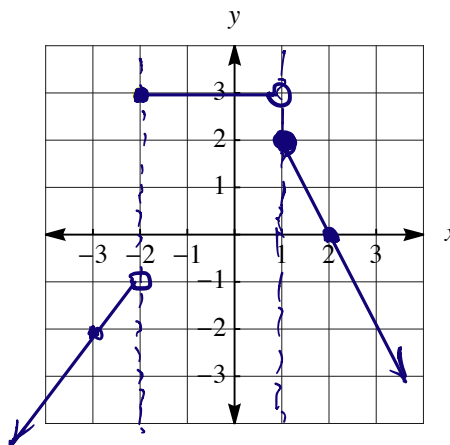
$$\begin{aligned} f(1) &= -1+2 = 1 \\ f(1) &= 3(1)-4 = -1 \\ f(2) &= 3(2)-4 = 2 \end{aligned}$$



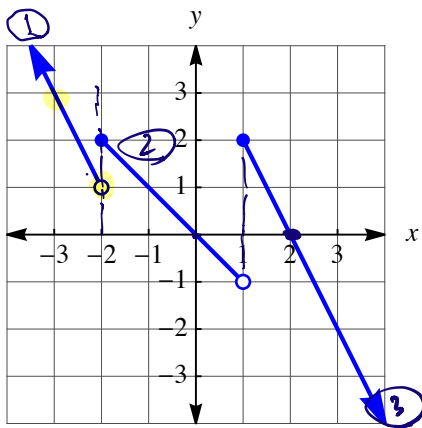
2. Graph the piecewise function

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

$$\begin{aligned} -2+1 &= -1 & -2(1)+4 &= 2 \\ -3+1 &= -2 & -2(2)+4 &= 0 \end{aligned}$$



3. Write the piecewise function for the following graph:



① $m = -2$ $(-2, 1)$
 $y - y_1 = m(x - x_1)$
 $y - 1 = -2(x - (-2))$
 $y - 1 = -2x - 4$
 $y = -2x - 3$

② $m = -1$ $(0, 0)$
 $y - y_1 = m(x - x_1)$
 $y - 0 = -1(x - 0)$
 $y = -x$

③ $m = -2$ $(2, 0)$
 $y - 0 = -2(x - 2)$
 $y = -2x + 4$

$$f(x) = \begin{cases} -2x-3 & x < -2 \\ -x & -2 \leq x < 1 \\ -2x+4 & x \geq 1 \end{cases}$$